PUBLIC PARTICIPATION IN SCIENCE AND TECHNOLOGY POLICY: CONSENSUS CONFERENCES AND SOCIAL INCLUSION

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PUBLIC PARTICIPATION IN SCIENCE AND TECHNOLOGY POLICY: CONSENSUS CONFERENCES AND SOCIAL INCLUSION

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To my son, Samrath
and
my parents

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SUMMARY

Recent years have seen increased calls for the participation of ordinary citizens or non-experts in science and technology policy as well as an increase in the number of institutional innovations that give shape to these calls. One such innovation is the consensus conference. Developed in Denmark and largely based on the ideals of deliberative democracy, this form of public participation in science and technology policy making has diffused across the world. In the U.S. a modified version of the consensus conference that combines online deliberation with face to face deliberations, termed as Citizens' Technology Forum (CTF) has been used in research settings. The ideals of respectful reason-giving, equality and inclusion form the bedrock of both the consensus conference and the CTF.

In this dissertation I look at the National Citizens' Technology Forum (NCTF) that took place in March, 2008 in six cities across the U.S. to study how inclusive these methods of public participation are in practice. My study looks at two of these sites, Site A and Site B, to understand whether inclusion in terms of presence, voice and being heard is achieved. By focusing on the talk within these deliberative forums I look at how the rules of engagement and status differences can affect inclusion. My main argument is that organizers and facilitators of deliberative exercises have to be reflexive of their role as well as aware of the group dynamics as these can influence inclusion and equality between participants. The results also address the larger questions within science and technology policy like the role of expertise and the public in policy making, the institutional design of participatory exercises, and their relation to the political culture and the policy process.

CHAPTER 1

INTRODUCTION

1.1 Research Background and Motivation

Since the 'deliberative turn' in democratic theory in the 1990s (Dryzek, 2000), different models of public participation have emerged such as consensus conferences, citizen juries and deliberative polling. As opposed to an aggregation of interests, these participatory models are based on the deliberative democracy theory ideal that decisions can be legitimate only when those that are subject to them have had a role to play in their formulation (Bohman, 1998). "… The legitimate exercise of political authority requires justification to those people who are bound by it, and decision-making by deliberation among free and equal citizens is the most defensible justification anyone has to offer for provisionally settling controversial issues" (Gutmann, 1996, p.344). In sharp contrast to liberal democratic theory that views citizens as passive and their preferences as static, deliberative democracy theory views citizens as active agents who through a process of reasoned argumentation can arrive at the best decision for the common good. The essential elements of deliberative theory are reasoned argumentation among equals in a deliberative space that is open and inclusive (Benhabib, 1996; Cohen, 1997; Gutmann and Thompson, 1996).

The "difference theorists" have challenged two of these fundamentals- the concept of "reason-giving" and that of equality. The idea that a deliberative space acts as a level playing field that erases differences in status blinds people to the difficulties that marginalized groups face in meeting these conditions of deliberation (Fraser, 1990; Phillips, 1994, 1995). Sanders

(1997) has argued that "real deliberation is likely to under represent exactly those who need representation the most. (…) Even if these people show up, they are likely to be seen as the least persuasive, to be discounted more frequently" (p. 349). Others have argued that the emphasis on reasoned argumentation privileges a particular discursive style at the cost of excluding other styles and perspectives (Phillips, 1995; Young, 1996). These criticisms have lead deliberative theorists to reformulate some of the concepts to better deal with conditions of pluralism (Chambers, 2003). For instance, rather than reasoned argumentation scholars talk of 'mutual justification' (Gutmann and Thompson, 1996, 2004; Bohman, 1998) and recently a group of deliberative theorists have argued for including negotiations based on self-interest and the conflicts between interests within deliberative space (Mansbridge et al., 2010). However, the issues of inclusion as well as of deliberating under conditions of pluralism still remain matters of contention.

Parallel to the deliberative turn in democratic theory was the "participatory turn" in Science and Technology Studies and a re-thinking of the relationship between the public and experts (Jasanoff, 2003). The uncertain nature of the problems and their consequences combined with an intertwining of facts and values require a new science that is open and plural, or "post-normal" in nature (Functowicz and Ravetz, 1992, 1993, 1994). Opening up what counts as expertise will lead to a wider variety of perspectives and a diversity of information to make decisions under these conditions. This "democratization" of expertise can be achieved by increased public participation where scientific claims are justified to a much wider group than just peers (Giddens, 1990; Jasanoff, 2003, 2005; Wynne 1996a, 1996b). Ordinary citizens bring to the table their knowledge, perspective and experience enhancing the decision making process.

This "democratization of expertise" leads to a more socially robust science and technology as well as sound decision making.

Many new methods of participatory technology assessment (pTA) such as consensus conferences, citizens' juries, scenario workshops have been developed. Most of these methods are based on deliberative democracy theory. Central to these institutional innovations is the concept of public participation as deliberation drawing on the tradition of deliberative democracy that believes open, reasoned public dialogue can lead to not just more reflexive decisions but also more legitimate decision making. In addition, they also link together the concepts of "post-normal" science and risk communication with deliberative democracy (Burgess & Chilvers, 2006, p.714). One such form of public participation is the consensus conference. Developed in Denmark in the context of a political culture that values the notions of the common good and consensus (Horst and Irwin, 2010) and adopted in many other countries, the consensus conference brings together informed citizens and experts to deliberate on controversial and emerging scientific-technical issues.

The broad question that guides my research is how do participatory processes include all participants. The provision of background materials on the topic, the presence of facilitators, the interaction between experts and participants are all features of consensus conferences that aim to make the process equal and inclusive. Many studies of consensus conferences have evaluated them in terms of process and impact but very few have actually focused on the deliberations themselves to understand how inclusion comes about. In this research I examine whether the deliberations within a consensus conference are inclusive in nature and include marginal or less powerful voices. These marginal voices include all those whom on account of race, gender, education and income, that is, both ascribed and achieved status characteristics, have not had a

decisive say in policy making. The consensus conference, like other models of public participation, is conceptualized as a forum for discursive interaction that is open and accessible and where members of the public can interact as equals without regard to the status inequalities that exist in the wider context. The concept of status has been studied widely in sociology. It is fundamental in understanding social stratification as it is closely associated with power and prestige. In general and broad terms, status is defined as a position within a network of social relations. Closely associated with these positions are beliefs about the worth of the individual based on expectations regarding the contributions of individuals to group goals. In sociology, one of the most developed research program that focuses upon status is the expectations states theory. Within this broad research program, the status characteristics theory focuses on the relationship between status and power. Status characteristics organize social interactions such that those who are higher in social status have greater power and prestige than those lower in status (Sell et al, 2004, Webster and Foschi, 1988). The normative ideal of an equal and accessible public sphere is particularly difficult to achieve within highly stratified societies as status differences may impinge on the process of deliberation. However, the elements of the consensus conferences such as the use of background materials (equal access to information) and presence of neutral facilitators are oriented to creating an equal and inclusive process. But how effective are they in meeting these goals? Do status characteristics impact the deliberative process? Who are the most influential within the deliberative process? Do the rules of engagement adequately address the problem of inclusion?

1.2 Research Question and Methodology

The difficulty in attaining a quality of discourse that is equal and inclusive has been documented by many researchers based on their study of differing kinds of deliberative events.

Achieving consensus is the part of the process that is fraught with pitfalls. Individuals and groups can tend to dominate the discussions leading to power imbalances. Pelletier et al. (1999) found that the outcome of a deliberative exercise reflected the values and interests of some stakeholders more than others and the position change of some participants did not match with their preferences and values expressed at the beginning of the deliberations. Barnes (2005) in her study found that deliberation in the sense of engagement and reflection rarely happened. Participants did not engage with other participants and there was little evidence of conflicting views being debated. There was also a gender difference in participation with men being more frequent contributors than women and many did not contribute anything to the dialogue as they only listened to the others.

My objective in this dissertation research is to examine how inclusive deliberation is in practice. Do ascribed and achieved characteristics such as race, gender, income, and education, impact the inclusiveness of the deliberative process? Is it possible for participants to deliberate as equals when their wider social context is characterized by high stratification? Do status differences among the participants lead to a neglect of the concerns and views of those who are less powerful? Does the format allow for an evening out of these status differences? My research questions, therefore, are the following:

1. How do status characteristics (ascribed and achieved) such as gender, race, education, income, and expertise affect the deliberative exercise?
2. How does the format affect the deliberative process? Did the NCTF create conditions which promoted open and inclusive dialogue?

The answers to these questions will also help in the analysis of the remaining research question:

3. Was the process inclusive?

The dependent variable is deliberation defined in terms of its aspect of inclusion. Inclusive deliberation is both external and internal. External inclusion can be measured by diversity or presence- the degree to which a wide variety of citizens and viewpoints are present. Internal inclusion refers to the structure of the deliberation- the extent to which less powerful concerns are voiced and heard. I hypothesize that internal inclusion will be affected by status, expertise and experienced facilitation. I consider reciprocity and reflexivity as a measure of inclusion as it measures the extent to which other voices are heard. Effective deliberation requires participants' to reflect on not just one's own opinions but also that of others, on the similarities and differences among them, leading to social learning. Thus, inclusion is denoted by both presence and voice, with the latter referring to not just the opportunity to express an opinion or view but also the possibility of being heard.

My research looks at the National Citizens Technology Forum (NCTF), a modified version of the consensus conference, held in March, 2008 on the topic, "NBIC (nanotechnology-biotechnology-information science-cognitive science or converging technologies) Technologies for Human Enhancement". The Citizens Technology Forum (CTF) is a version of the consensus conference model that has been modified for a large, diverse, country like the United States by including an internet component to the deliberations and involving multiple sites simultaneously deliberating on the same topic. The research focuses on understanding whether the deliberations within the NCTF were inclusive, allowing for perspectives of less powerful participants to be voiced and heard and reflected in the group's recommendations. My sources of data are the transcripts of the face to face deliberations as well as those of the internet deliberations; the data from pre-and post-surveys administered to the participants; and from interviews of participants and facilitators. This study uses a case-study methodology and the main method of analysis is

content analysis of the transcribed deliberations and interview data. The content analysis is done using a codebook developed on the basis of previous studies of deliberative talk. Case study design has often been criticized on the grounds of lack of generalizibility of results. But the detailed analysis of the deliberations as social interaction to examine voice and influence necessitates a case study design. And as argued by Davies et al. (2006) in their evaluation of the National Institute of Clinical Excellence, case studies are required in a field of research that is theory dominated so as to "conceptualize deliberation as a set of participant activities" (p.54). Understanding who or what is excluded and what is considered legitimate and influential requires a detailed analysis of the deliberation process. Also, studying two cases of the NCTF strengthens my research design.

1.3 Significance and Contribution

There have been a number of studies of consensus conferences and other participatory processes and the evaluative literature on these processes is growing. Most of these studies utilize evaluative criteria that are drawn from deliberative democracy theory (Rowe and Frewer, 2005, Rowe et al. 2004, 2008) to look at the process of deliberation while others have looked at the impact that these processes have had on policy (Guston, 1999). But very few studies have focused on the actual talk within these participatory forums. There is work on the analysis of talk within political deliberation (Dutwin, 2001, 2003), participatory healthcare decision making (Barnes, 2002, Davies et al., 2006) but very little in science and technology deliberations. In this area, many researchers are now exploring participants' perceptions and experience of deliberation, a hitherto, neglected area of research (Delborne et al., 2011; Gorsdorf, 2006; Harvey 2009; Powell et al., 2011; Powell and Kleinman, 2008). These studies provide an insight

into how focus on the participants' perceptions of the process provides a richer and more detailed evaluation of the process. But research focusing on the talk within the process still remains missing. Such micro-analyses are invaluable in understanding whether deliberative processes live up to the normative ideals of equality and inclusion. This research aims to fill this gap.

Since the NCTF was held in 2008, a number of articles have been published that look at different facets of the process. The NCTF project report written by Hamlett, Guston, and Cobb (2008) provides a summary of the process and uses data from the survey and the final reports to come to certain conclusions about the project. The authors find that there is strong support for citizen participation in S&T decision making, and the public is capable of thoughtful and informed analysis of complex scientific topics when provided with support in the form of access to information and experts. Hamlett and Cobb (2008) analyzed the survey data to ascertain the occurrence of polarizing effects in deliberation; Powell and Kleinman (2008) have examined the effect of these deliberations on citizens' perceptions of their efficacy and knowledge; Philbrick and Barandiaran (2009) evaluated the NCTF as a "proof-of-concept" for incorporating consensus conferences in the US policy process using the background materials and final reports; Kleinman et al. (2009) examined the incentives that motivate the public's participation in the debates around emerging technologies; Delborne et al. (2011) evaluated the online deliberations based on the participants' perceptions of the internet deliberations using the internet transcripts and interviews of participants at one of the other NCTF site; Powell et al. (2011a) have studied how ordinary and representative citizens were conceptualized in the NCTF process; Powell et al. (2011b) explore the participants perceptions of the deliberative quality and their empowerment utilizing the online transcripts, survey data, and interviews of participants at one of the other NCTF site. However, the recordings of the deliberations remain unanalyzed.

This dissertation looks at a somewhat ignored aspect of public participation research- the deliberations themselves. It also focuses on one particular aspect of the participatory process, that of inclusion. This approach provides a more subjective and grounded perspective to understanding the practice of deliberation and as well as the interaction between laypersons and experts. This focus will also help to understand how deliberation works in conditions of pluralism. The results of the research can be used to enhance the theory and practice of citizen participation in S&T policy. They can also help inform the design of participatory processes.

1.4 Structure of the Dissertation

In Chapter 2, I discuss the literature on deliberative democracy theory that focuses on inclusion. Deliberative theory is a vast field and I only touch on particular aspects. In addition, I talk about the move from a deficit model of public understanding of science to the participatory model in Science and Technology Studies. I look at research on consensus conferences since that is the particular form of public participation that this dissertation focuses on. I also discuss the empirical work in different fields such as small group theory, jury deliberations, and political deliberations that have looked at the impact of race, gender, and status on the group process. I also present the expectation status theory that postulates observed differences can lead to inequalities in social interaction. This review leads to the formulation of my research hypotheses.

Chapter 3 describes the National Citizens Technology Forum, its design and goals as well as the policy context within which the research project was formulated. This chapter also presents the data as well as the methodology I use to analyze the data. The transcription of the data and the development of the codebook are also described.

The next three chapters constitute the empirical part of the dissertation. I look at inclusion in terms of being present, having a voice, and being heard. The chapters are organized on the basis

of these three categories rather than around the two cases. Chapter 4 looks at the recruitment of participants, their demographic characteristics and diversity, and the rules of engagement. In Chapter 5, I examine the effect of status differences, the process of facilitation, and the format on talking time or voice. Chapter 6 looks at whether differing viewpoints and perspective are heard and provided space in case of disagreements. Summaries of results are present at the end of each chapter but these are discussed in detail in the concluding chapters.

Chapters 7 and 8 conclude the dissertation. Chapter 7 contains a discussion of the main findings of the research. The results, in terms of the hypotheses, are presented in Chapter 8. In addition, I also present the limitations of the research as well as policy implications and suggest research directions that can further develop the work contained in this dissertation.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter examines the theoretical traditions that underpin public participation in science and technology policy and provides a justification for the hypotheses that form the basis for this study. As stated in Chapter 1, public participation in science and technology policy is based on the theoretical traditions of deliberative democracy and is informed by the changing relationship between science and society as envisioned by Science and Technology Studies (STS). Developments in fields as various as policy sciences, risk management, political theory, and sociology have also played a role in the way public participation is envisioned. The particular participatory process that this dissertation focuses on is a modified version of the consensus conference, specifically the National Citizens Technology Forum (NCTF). Developed in Denmark by the Danish Board of Technology in 1987, the consensus conference brings together informed citizens and experts in a deliberative forum and results in a written report containing a set of recommendations formulated by consensus of the participants. With time, this format has been adopted in various contexts and countries and research on how this mode of public participation works in practice has been building up. This body of research looks at the process as well as the impact and outcomes of consensus conferences. In addition to the evaluative research on consensus conferences in general, I will also summarize the research on the NCTF. The literature review points to gaps that exist in the research on participatory processes in science and technology policy leading to the research questions and hypotheses that drive this research.

2.2 Citizen participation in science policy: The influence of deliberative democracy

In terms of academic research, both the policy sciences as well as science and technology studies have contributed to the rich literature around citizen participation in policy making. Both fields have focused on citizen participation through deliberation, viewing public participation as a dialogue, influenced by the concept of deliberative democracy that considers public dialogue and discourse as an alternative to representative democracy. In contrast to decisions based on voting or an aggregation of interests, deliberation is based on reasoned argumentation among equals.

The normative roots of deliberative democracy theory are heavily influenced by the work of Jurgen Habermas and his concept of the "public sphere". As an ideal type, the public sphere is defined as being "made up of private people gathered together as a public and articulating the needs of society with the state" (Habermas, 1989, p.176). The articulation of needs occurs by dialogue and argument and the process is characterized by universal accessibility, autonomy and freedom from coercion, equality, and the use of reasoned arguments. Decision making is a process based on a discourse in which actors state and justify their positions, listen respectfully to others and are open to revising their positions after listening to other reasoned viewpoints. It is a process by which the best decisions for the common good are reached by consensus. This discourse or "communicative action" helps to reveal universally valid norms, that is, norms that all can assent to.This dialogue should be open to participation by all, free of coercion, respectful, and involve justification of all claims based on a consideration of the common good.

Such a process of decision making permits a broader understanding of different interests leading to learning and produces legitimate decisions. Deliberative democrats argue that policy making should be based on the Habermasian concept of deliberation that is rational, open, equal

and unfettered by power. Decision making that is based on such a deliberation leads to rational and legitimate outcomes that are acceptable by all. The deliberative space is one where participants come together as equals; putting aside their individual preferences and exhibiting openness to differing viewpoints so as to come to the best decision based on the common good. "Deliberation is understood as informed, respectful reason-giving among participants who have equal standing—social, political, and informational—to speak" (Hamlett, 2007, p.4) The outcomes are legitimate as deliberation allows participants to assent to the decision that they will be subject to (Cohen, 1997; Bohmann, 2000). Not only are outcomes legitimate, but the process also results in an empowered citizenry. "(…) political education, participatory action, and successful social problem solving could together help constitute a community fully capable of steering its own course into the future" (Dryzek, 1989, p.118). Deliberative democracy empowers citizens by increasing their sense of worth and strengthens their identification with their community. Deliberation increases reflexivity and leads to an increased awareness of one's own values and experiences as well as those of others; it can help resolve conflict; and creates engaged citizens (Fishkin, 1995; Chambers, 1996; Gutmann and Thompson, 1996).

Delli Carpini et al. (2004) have reviewed the literature on public deliberation, in particular, the literature (theoretical as well as empirical) that focuses on the individual and collective benefits of citizen engagement. What is common to the literature is the definition of deliberation as argumentation that is reasoned, egalitarian and reciprocal in nature. Reasoned and rational argumentation is the bedrock of this dialogue. Based on this Habermasian ideal of the public sphere and communicative rationality, deliberation is defined in terms of its normative characteristics of rational discourse, equality, and legitimacy.

As stated in Chapter 1, many theorists have replaced the concept of reasoned argumentation with that of 'reason-giving', that is, justifications based on reasons that are not just understandable but acceptable to those subject to them (Gutmann and Thompson, 2004). Within the broader deliberative democracy tradition; many theorists have, moved away from focusing on reason by rational argumentation to include rhetoric as a valid form of communication within a deliberative forum (Dryzek, 2000). Similarly, many scholars have re-examined the role of consensus within the deliberative process (Bohmann, 2000) and are carving a space for self-interest (Mansbridge et al, 2010). Others have focused on how power and status differences can undermine inclusive and egalitarian deliberation (Young, 2003). The "difference" school of scholars also takes issue with the concept that emotion, power and rhetoric do not have a role to play in deliberation. Scholars such as Benhabib (1996); Fraser (1990); Sanders (1997); and Young (1996) argue that this ideal-typical formulation of deliberation excludes many. The Habermasian model of reasoned argumentation among equals cannot apply under conditions of cultural diversity and social inequality. The difference theorists argue that such a view of deliberation is biased toward the values and norms of dominant social groups (such as men) and excludes women and minorities. ''By restricting their concept of democratic discussion narrowly to critical argument, most theorists of deliberative democracy assume a culturally biased conception that tends to silence or devalue some people or groups'' (Young, 1996, p.120). The emphasis on deliberation as rational argumentation is itself exclusionary in nature as it emphasizes a form and style of discourse that excludes other discursive styles. The rational argumentative style of discourse can also contribute to exclusion as particular forms of knowledge may not be considered legitimate (Barnes & Bowl, 2001). The structural inequalities present in the wider society are reproduced within deliberative forums

(Young 2000, 2003). The emphasis on reasoned argumentation that is rational and calm also privileges a particular group as it does not take into account how status differences influence communication styles (Sanders, 1997). Mansbridge (1983) has argued that consensus is possible without silencing minority views within groups that have close personal ties but is problematic within groups that lack these personal ties, especially when significant inequalities are also present. As pointed out by Sanders (1997) deliberation requires not just equal resources and an equal opportunity to participate but it also requires equality of what she terms "epistemological authority" or the equal regard of one's arguments. A major challenge in deliberation is

> (…) how more of the people who routinely speak less- who, through various mechanisms or accidents of birth and fortune, are least expressive in and most alienated from conventional American politics might take part and be heard and how those who typically dominate might be made to attend to the views of others (p. 352).

Many theorists have questioned the exclusion of rhetoric as a valid style for deliberation (Bohman, 1996; Richardson, 2000; Dryzek, 2010). Young (2000) takes issue with the characterization of deliberation as free of rhetoric and emotion. Rhetoric can be more persuasive and effective than dispassionate and neutral speech. Other styles of speech such as rhetoric, greeting and storytelling have to be recognized as valid styles of deliberation (Black, 2009; Ryfe, 2006; Sanders, 1997). Stories can help to bridge the differences among participants. Black (2009) argues that stories are a medium for constructing identities and managing them with regard to others. Many others have also argued to extend what counts as justification within deliberation to include other experiences and styles such as drama, anecdote, and role play (Van Stokkom, 2005; Davies et al., 2006; Barnes, 2004). The critique by the 'difference' theorists has played a large role in adapting the concept to conditions of pluralism. "Deliberative theory has

moved away from a consensus –centered teleology-contestation and indeed the agnostic side of democracy now have their place-and it is more sensitive to pluralism" (Chambers, 2003, p.321).

Empirical work has also revealed the important role of emotion within deliberation. Davies et al. (2006) study of the Citizens' Council of NICE (National Institute for Health and Clinical Excellence) shows that participants' emotional engagement with the topic enhances deliberation. Their study shows that dialogue between participants was more deliberative in style "when the content under discussion concerned concrete cases and when they were responding to strong invested statements from witnesses and could identify and mobilize their own strongly held opinions in response" (p. 129). Barnes (2008, p.473) argues that deliberation requires "emotional morality" or "recognition and respect for the emotional content of experiences and values and the authentic expression of these as a necessary part of dialogue on issues that are directly relevant to such experiences and values." Van Stokkom (2005) has also pointed out that emotion can be critical as a motivator for deliberation: ''many participants are motivated by negative emotions, whether these are from the anger/indignation group or the fear/distrust group. Similarly, in another context participants may nurture hope and positive expectations'' (p. 396). Emotional statements and narratives, thus, are considered valid discursive styles of inclusive deliberation.

The criticism by the difference theorists as well as by theorists who identify themselves as deliberative democrats is oriented towards broadening the definition of deliberation. The Habermasian ideal speech situation is an ideal type that is rarely encountered in reality. It imposes a set of conditions on the participants within a deliberative forum that are difficult to meet. As Mansbridge et al. (2010) point out; the classic deliberative ideal is moving away from its emphasis on reason to include mutual justification as support for one's arguments. Arguments

or statements need to be persuasive and should be justified in terms that are acceptable to all participants. Reciprocity is an important characteristic; communication should be in terms that others who do not share the speaker's frame of reference can accept (Gutmann and Thompson, 1996). However, criticizing the primacy of rational argumentation does not mean that deliberation becomes a cacophony of voices for the norm of reasonableness remains central to deliberative discourse. Reasonableness entails that the dialogue be characterized by openness and mutual respect. Participants should be committed to persuading others of their viewpoints and claims as well as be open to persuasion by differing viewpoints. Mutual respect underlies the dialogue, particularly in the case of disagreement. Thus, citizens have to be open and reasonable and be prepared to challenge others through criticism.

According to Dryzek (2000) anything goes provided it is "(a) capable of inducing reflection, (b) noncoercive, and (c) capable of connecting the particular experience of an individual, group, or category with some more general principle" (p.68). Reflection also requires diversity. A diversity of participants is important so that differing viewpoints and opinions can be expressed and heard. Listening to others ''leads to empathy with the other and a broadened sense of people's own interests through an egalitarian, openminded, and reciprocal process of reasoned argumentation'' (Mendelberg, 2002, p.153). In fact, legitimacy of deliberation depends on diverse participation along with inclusion of minorities in terms of status or by opinion or discourse (Benhabib, 1996, 2002; Chambers, 2003; Dryzek, 2009). Much of this debate on what is legitimate and acceptable within deliberation has remained theoretical. Both sides "(…) have reached a theoretical impasse, each expressing contrasting-sometimes utopian versus dystopian-visions of deliberation" (Hickerson and Gastil, 2008). Micro-analysis of deliberative talk can provide empirical material to this debate.

Taking into consideration the critique by the difference theorists and the broadening of the definition of deliberation, Burkhalter et al. (2002), drawing on a number of theoretical traditions, have defined deliberation within small groups as, " (a) a process that involves the careful weighing of information and views, (b) an egalitarian process with adequate speaking opportunities and attentive listening by participants, and (c) dialogue that bridges differences among participants diverse ways of speaking and knowing" (p. 418).

2.3 Participatory Technology Assessment

The influence of participatory or deliberative democracy in the policy sciences is seen in the development of the concept of participatory policy analysis. The positivist bent in most policy formulation has been criticized by many policy scientists who have argued that the disconnect between social norms and values and the policymaking process is responsible for the unsatisfactory outcomes of many policies (deLeon, 1988; Dryzek, 1990; Stone, 1997). The case for participatory policy analysis is made on the grounds that citizens can best articulate their own needs and concerns and their participation can lead not only to more informed decision-making but also lead to the development of a more involved public (deLeon, 1988). Fischer (1993) has argued that this collaborative, participatory approach works best when the problem is a "wicked" one; characterized by a mix of technical and social issues, with long term impacts, and sufficient time as well as resources are available to solve them.

Many policy issues connected with science and technology represent this mix of social and technical issues. As science becomes increasingly complex and has an impact on not just our everyday lives but also on our deepest held values, most of the issues raised by newer developments in science and technology can be characterized as wicked problems. Technology

assessment is a means of forecasting issues and problems that can arise as technology develops; it helps to anticipate them and find ways to mitigate their effects and hopefully, steer a different course for it. Scientific developments are increasingly bringing up a plethora of ethical and controversial issues to the debate regarding the relationship between science and society. In addition, the rate of technological change is increasing manifold bringing about new institutions and ways of doing things. Technology assessment is a way to make sense of this change by broadening our understanding of the way in which science and technology are impacting our lives. Participatory technology assessment requires that the public and not only the experts are involved in this process so as to improve our understanding of the societal implications of new and emerging technologies.

The call for increasing the involvement of the public and ordinary citizens in science and technology policy came about as questions started being raised about the role of expertise in the aftermath of major environmental disasters such as the Three Mile Island and Chernobyl and the debates about the introduction of genetically modified organisms. These incidents along with the uncertainty associated with development such as GMOs resulted in not just eroding trust in the capacity of experts to handle such issues but also in a loss of legitimacy regarding their governance of complex science and technology issues. Citizen participation could be a panacea to these ills plaguing the governance of science and technology. Bringing the ordinary citizen into this expert led decision making process would help the policy process become more legitimate, open and accountable (Fischer, 2005; Functowicz and Ravetz, 1993; Irwin, 1995; Leach, Scoones and Wynne 2007). This "participatory turn" in the decision making process has led to novel modes of public participation and involvement that are based on the normative principles derived from deliberative democracy theory.

The "co-production of science and society" and the social embeddedness of science have provided newer insights into the way in which the relationship between citizens, experts and science is structured and the way public participation in science and technology policy can help re-shape the relationship (Jasanoff, 2003; Wynne, 1996). Non experts bring not just a different perspective but both expertise and lay knowledge are produced and shaped by the interaction between experts and lay citizens (Bucchi & Neresini, 2008). Public participation "can create mutual understanding among scientists and the public, constructively influence the conduct of science in response to evolving ethical norms, and modify the direction of science so that it can better address societal goals and priorities" (Sarewitz, 1997, p. 31). Rather than a means for the public acceptance of newer technologies, public participation gives the public a role in anticipating and shaping new technologies. Public participation when a technology is taking shape allows values and norms to be incorporated early in the development of a technology and make it possible for alternative pathways to be explored.

The newer methods of technology assessment have moved away from a technical, ex-post assessment to a process that combines technical and participatory appraisal that is anticipatory in nature. "A well-crafted TA capability can assist citizens and decision-makers in understanding these kinds of broad and deep implications of technological innovation – implications that might otherwise escape attention until well after they, too, have become entrenched"(Sclove,2010, p. 3). The newer models of technology assessment such as Constructive Technology Assessment (CTA), Real Time Technology Assessment (RTTA), and Integrated Technology Assessment emphasize public participation (Guston and Sarewitz, 2002; Kasemir et al., 2003; Schot and Rip, 1997). These methods of technology assessment repudiate the delineation of invention and regulation; emphasize engaging the public early and

continuously as a technology develops (Renn et al., 1993); and underscore the importance of including the societal aspects of innovation by integrating expert and public deliberation (Chilvers, 2008). A wider variety of values and meanings and differing types of public knowledge can create a socially robust science (Leach et al., 2005). The concept of upstream engagement or involving the public early in a technology's development is seen as being effective in dealing with ethical and social issues that often arise after a technology has matured and "represents a call for greater reflexivity within science, in which scientists engage with whatever values underlie their work and what values will be reproduced through their work" (Rogers-Hayden and Pidgeon, 2007, p. 357). Stebbing (2009) argues that an "interdisciplinary and inclusive upstream debate" about values that involves the public, government, industry, and interest groups can help create a sustainable ethical, regulatory and legal framework for nanotechnology that may prevent the loss of public trust that has often accompanied the introduction of new and emerging technologies.

But public participation can lead to a more "democratically responsive R&D enterprise" only if it can include perspectives belonging to the less powerful members of society. The inclusiveness of the process is an important element in determining whether these goals are met. For Stirling (2005) such processes should

> (…) "open up," and reveal inherent open-endedness and contingency to, wider policy discourses by constructing appraisal that poses alternative questions, focuses on neglected issues, includes marginalized perspectives, triangulates contending knowledge, tests sensitivities to different methods, considers ignored uncertainties, examines different possibilities and highlights new options (p. 229).

2.4 The Consensus Conference and its Evaluation

Developed by the Danish Board of Technology in 1987, the consensus conference is a tool of participatory technology assessment that brings together informed citizens and experts in a unique format that enables development of informed views, an exchange of ideas between citizens as well as between citizens and experts and results in a consensus decision arrived at on the basis of these interactions (Andersen and Jaegger, 1999). Though the consensus conference allows expressions of minority views, the concept of consensus is central to the format. Many scholars, however, are re-evaluating the role of consensus in science and technology participatory processes (Stirling, 2008; Horst and Irwin 2010). For instance, Swierstra and Rip (2007) argue that methods emphasizing consensus may not work when dealing with emerging technologies such as nanotechnology that are characterized by ambivalence-"the general ethical point about ambivalences is that there is no simple resolution"(p.18). The emphasis on consensus in the design of public participation has also been criticized for ignoring conflict and negotiation which often leads to a consensus that is an expression of the majority interests. And the consensus approach need not be suitable for all issues (Van den Hove, 2006). In addition, Pestre (2008) argues that public participation may not be able to influence the direction of science and technology development as "…these are regulated mainly by other (competing or parallel) institutions that lie outside the dialogic order: markets, administrations, courts of justice, etc." (Pestre, 2008, p.103).

The evaluative research on these participatory processes including consensus conferences has focused on measuring specific cases against a framework of effective deliberation (Renn et al., 1995; Webler et al., 2001; Rowe and Frewer, 2005). Many evaluative studies of consensus conferences have looked at the impact of such conferences on policy.

Guston (1999) argues to expand such evaluation beyond impact on decision making to include – actual impact on the policy process; change in general thinking about the policy issue; learning by organizers and experts; and learning by participants and the public (Table 5, Schematic Research Protocol, p. 460). In a similar vein, Rowe and Frewer (2000) propose a mixture of *acceptance criteria*, which include representativeness (democratic and demographic), independence (from the sponsoring body), early involvement of the public "as soon as value judgments become salient," influence ("a genuine impact on policy"), and transparency; and *process criteria*, which include participants' access to appropriate resources, clear task definition, structured decision making, and cost-effectiveness (p. 10-16). A number of evaluations have focused on the impact of the conference on citizen learning as well as efficacy using survey data to measure opinions and knowledge before and after deliberations as well as to gauge the public's attitudes towards technology (Burri and Belluci, 2007). Not all the evaluations show participation in a positive light. Ferreti and Pavone (2009) have examined public participation in the field of biotechnology in Germany and Spain to determine the expectations of civil society from such exercises and conclude that participation does not always increase mutual learning and understanding, nor does it necessarily imply better democracy.

Research has also focused on the design of these deliberations in the hope of producing policy recommendations regarding more effective design that can produce better outcomes. Huitema et al. (2007) provide recommendations to improve the design of the citizens' jury. Skorupinski et al. (2006) present a case study of the Swiss type of a consensus conference with the intention to clarify criteria that support effective communication and which especially consider ethical aspects in the field. Powell and Colin (2008) focus on the goals and desired

outcomes of public participation to provide recommendations for more meaningful engagement of citizens in science and technology.

Most of these evaluations that focus on the process are based on criterion that are distilled from deliberative theory. Only in the very recent past has the framework been widened to include other theoretical viewpoints as well as the perspective of the participants and experts. Powell and Kleinman (2008) focus on how the process of participation in a consensus conference affected the perception of the participants with regard to their participation in nanotechnology issues as well as their motivation to participate in other such exercises. Their analysis reveals that consensus conferences empower citizens as well as enhance the knowledge and motivation of participants. The interaction with the experts is also an important component of the process in building capacity of ordinary citizens. Chilvers (2008) brings into the picture the perspective of participatory assessment experts and the manner in which they frame participation, expertise and scientific citizenship. Blok (2007) views consensus conferences as "democratizing relations between science, policy and the public" (p.164). Utilizing concepts from the sociology of scientific knowledge he analyzes consensus conferences as the negotiation of scientific claims with the latter being contested and interpreted through deliberations rather than taken as given and authoritative.

Many researchers are now calling for adopting a more varied repertoire of methods to analyze models of participative technology assessments. Hampton (2004) argues that effective public participation requires methods of policy analysis that can accommodate the discourse of the participants' opinions, preferences and values as well as the social and cultural contexts of the discourse. The use of narrative policy analysis can incorporate this cultural and social diversity while analyzing the manner in which preferences are expressed by the public. Harvey

(2009) argues that dramaturgical; discourse and conversation analysis; and ethnographic and phenomenological approaches may be better suited to evaluating participation than the existing quantitative and quasi-experimental approach. The latter ignores the specific experience of participants as well as what actually happens in terms of the actions of participants and how these influence the proceedings and outcome. Wolfe et al. (2002) formulate an encompassing explanatory framework within which to understand decision making about controversial technologies. Evaluation should focus on questions such as "legitimacy of the participants, the groups they may represent, and of the forum for involvement; representation—the degree to which participants represent the public, particular constituency groups, or segments of the population; exclusion—who is intentionally or unintentionally excluded from participation and which parties remove themselves from the process; and power and authority—among individual participants and formalized advisory groups" (p. 136). The framework also includes normative issues such as "the appropriate role for nontechnical constituents in decision making; optimal forms of participation; the degree to which different parties, values, and interests should shape or determine decision outcomes; and the role and influence of different levels and forms of knowledge" (p. 136). Joly & Kaufman (2008) argue that the 'upstream engagement' concept is still embedded in a linear model of innovation and is not useful to understanding the co-production of innovations especially in the case of nanotechnology where "socio-technical networks are already aligned by powerful actors and a worldwide agenda". They propose an alternative approach which combines Actor–Network Theory (ANT) with the reflexive and ongoing implementation of public participation.

One of the evaluative criteria used for consensus conferences is fairness which is defined in terms of the extent to which relevant social divisions and categories are replicated in the group

of participants. This form of representation is not the same as proportional or statistical representation but approximates what Birch (1971) terms as "descriptive representation" or "microcosmic representation", that is, people are chosen on the basis of demographic characteristics so that the group is a microcosm of the larger society (Parkinson, 2003). In addition to race, gender, ethnicity, sexual orientation, etc. "shared experience" can also be a criterion of selection (Mansbridge, 1999). In the consensus conference model, the recruitment of participants requires great care for the panel of lay participants is at the center of the process. It "(…) was, and is, being employed to include lay people's views, concerns, arguments and reasons in assessments of issues of societal relevance and, in some cases, to allow for lay perspectives to influence regulation and political decision-making".[2] The consensus conferences model rests on the premise that participation of a diverse panel of citizens will lead to the articulation of a variety of values and perspectives.

The issue of representation is closely linked to diversity and the concept of inclusive deliberation. While recruiting participants for a consensus conference, the organizers hope to have a group of participants that are representative of the diversity of the wider population in terms of age, gender, education, income, values, opinions, and discourse. Statistical representation is not the goal and neither should individuals be seen as representing the social group from which they are drawn. As Dryzek (2010) points out, a researcher should be open to the diversity of discourse that an individual inhabits. "Thus, persons are not simply bundles of discourses; autonomous individuals can reflect across the discourses they engage, even as these individuals can never fully escape their constraints" (p.48). The diversity of participants

[2] Nielsen et al. (2006). Consensus Conference Manual. LEI: The Hague. Downloaded from http://www.ethicaltools.info/content/ET4%20Manual%20CC%20%28Binnenwerk%2040p%29.pdf

implicitly implies a diversity of viewpoints, each of which has to be heard, considered, and engaged with in order to come to an agreement.

2.5 Opening the Black Box of Deliberation

The literature review reveals that little of the evaluative research on consensus conferences and other participatory technology assessment methods focuses on what really happens in the room-the interaction between the participants; between the participants and facilitators; and the process by which consensus is achieved. But the body of work in areas of political deliberation, risk perception, and small group theory provides valuable insights into decision making and group dynamics. With regard to research on public deliberations, many scholars have expressed concern about the effects of inequalities such as race, gender, and class on deliberations (Mansbridge, 1983; Sanders, 1997; Young, 1996). This body of literature shows that these factors do influence group dynamics and decision making. So does research on risk perception and risk analysis.

This work in the area of environmental risk has focused on the relationship between gender, race, environmental values and environmental risks utilizing survey data. Karakowsky and Elangovan's (2001) work shows that there is a male bias in with regard to the risk preferences that are ultimately accepted by a group. Studies on perceived health and environmental risks have found that women are more risk averse than men. Flynn et al. (1994) found a "white male effect" in their study on risk perceptions; as a subgroup white males were different from everyone else in terms of their risk perceptions. These race and gender differences have been explained in terms of the limited decision making power of women and minorities; the difference in social roles and "everyday activities" of men and women; and the greater likelihood

that minority communities will bear a greater proportion of environmental harm on account of location of hazardous facilities (Davidson and Freudenburg, 1996; Flynn et al., 1994; Satterfield et al., 2004). Research on risk perceptions has also shown that men and women differ in terms of their risk tolerance. The theories of risk perception, especially the work of Douglas and Wildavsky (1982), also suggest that risk perceptions are socially embedded. Worldviews or culturally based beliefs and notions regarding the nature of the world shape risk perceptions. Douglas and Wildavsky in their book, *Risk and Culture* (1982), argue that collectively shared representations shape the meaning and perceptions of risk. Another perspective to study risks adopts the psychometric or psychological approach. Categorization of something as risk involves integrating norms and values with facts. Slovic's (1993, 1999, 2000) work on risk perception shows that knowledge; novelty; amount of personal control; and harmful potential all determine risk perceptions.

The work on jury deliberations also provides valuable insights about the effects of gender, race/ethnicity and socio-economic characteristics on deliberation. Verba et al. (1995) have pointed out the education is a major contributor to inequalities in deliberation. The well-educated have better reasoning skills which has an impact on the argumentative aspect of public deliberations. Less educated persons do not have access to occupations where reasoning skills develop and also lack access to the existing public arguments around these issues (Nie et al., 1996; Mendelberg, 2002). Men have been observed to speak significantly more during jury deliberations as compared with women (Marsden, 1987).

The research on the relationship of socio-economic characteristics to political participation has yielded a large body of literature. The socioeconomic status model developed by Verba and Nie (1972) has had a seminal influence on this area of research. In this model, a

major determinant of political participation is individuals' resources such as time and money and their attitudes towards the political system. Higher status individuals are more likely to participate in the political process as compared with lower status individuals. The social environment of the former encourages and enforces these participatory norms and civic attitudes as well as equips them with the skills required for effective participation. However, empirical studies on the effects of gender, race, and ethnicity on political participation have produced conflicting results.

Research on small group decision making, largely drawn from sociology and social psychology, also provides valuable insights into the deliberative process. Mendelberg (2002) provides an excellent review of this literature. An important finding in the small group research is that deliberation can result in polarizing effects; that is after deliberation the group opinion aligns with or moves in the direction of the pre-deliberation views of the majority. This directional change has been explained in two ways-the holders of minority opinions change their views so as to be part of the majority or the shift occurs as the majority can offer more convincing arguments due to their number.

Some of the literature on citizen participation in health care decision making has also addressed issues of differences in participation rates (Barnes 1999, 2005; Davies et al., 2006). Barnes (2005) in her study found a gender difference in participation rates with men being more frequent contributors than women. Also, there were some participants who did not contribute anything to the dialogue as they only listened. Davies et al.'s (2006) rich, ethnographic study of the citizens councils established by the National Institute of Clinical Excellence in the UK also provides evidence of differing rates of participation. Research in other areas of participation, however, contradicts this finding. Blais et al. (2008) in their study of the British Columbia

Citizen's Assembly on Electoral Reform did not find any support for the argument that well-informed or politically sophisticated participants will dominate the decision making process or contribute more to the discussion. Their findings reveal an equality between participants and the authors credit the design of the project for the lack of any significant difference between "the more and the less sophisticated participants" with respect to their reasoning process or their final preferences.

2.6 Rules of Engagement

Can the design of participatory processes result in an obliteration of the differences in skills and resources of the participants? An important factor that is seen to account for the lack of differences in participation is the set of rules that govern the deliberation or the "rules of engagement", such as the requirement of consensus. Institutional design or the rules of engagement can shape participants' behavior and affect outcomes. Such rules include the decision rule (consensus or majority) or the size of the group (Elster, 1998; Ferejohn, 2000) or the gender composition (Mendelberg and Karpowitz, 2006). "We find that deliberation can work as expected, enhancing distributive justice – and creating a long list of other positive outcomes – but only under certain conditions. Those conditions are structured by the decision rule (majority rule or unanimous vote) and by gender composition. Rules and gender interact to shape the group's social norms. When deliberation is not properly structured by rules and norms, it does not conform to the expectations of its proponents" (Mendelberg and Karpowitz, 2006, p. 2). The gender composition of the group rather than variations between genders has been noted to be an important influence on deliberation by others, too (Aries 1996). Elster (1998), on the other hand,

accounts for impartial and inclusive deliberation by small size and random composition of a group.

Smith (2009) enumerates a number of rules that can affect inclusion in deliberation. The design or the format should provide equal opportunities to all participants to express their views and be heard so they have equal chances to affect the output of the institution. These opportunities can level differences in skills and competency, if such differences exist. A procedural rule that affects inclusion is the selection criterion. By its very nature all those who are affected by a decision cannot participate in a consensus conference. Therefore, the selection procedure determines who is included. Difference theorists have emphasized that presence is important- if the excluded groups are not present then the decisions will not respond to their concerns (Phillips, 1995, p.13).

An important design factor is the presence of facilitators. "Facilitators and chairs…can not only enforce the rules of engagement (turn taking, length of each turn, actor speech rights, time keeping, and the like)," they also can "direct the substantive content of debate and discussion, determining what counts as relevant speech and opinion and maintaining control over the knowledge that is voiced and which issues are exposed and debated" (Harvey, 2009, p. 151). But their influence can also operate in other more subtle ways. The role of a facilitator is usually defined in terms of impartiality. The facilitator has to guide the group to reach a decision without influencing the process. Griffith, Fuller, and Northcraft (1998) focus on what they term as the "paradox of facilitation- the influence required to facilitate a group changes the group's outcomes". Drawing upon Kahnemann et al.'s work (1982) on decision making, they argue that there are three sources of a facilitator's influence- framing, anchoring, and salience. The manner in which a facilitator poses a question or an issue, the reference points a facilitator uses to

introduce an issue and the salience of the information provided by the facilitator all contribute to influencing the decisions the group takes.

2.7 Theoretical Background

The theoretical work that grounds my research questions is the sociological work on small group interaction, in particular, expectations state theory and its sub-field, status characteristics theory. The expectations state theory has been defined as a research program as it consists of a number of interrelated theories along with a variety of empirical work testing the same (Wagner and Berger, 1997). In essence, the theory explains interaction amongst members of a group in a task situation and the development of power and prestige hierarchies within these groups. Members of the group draw upon information such as status, performance, and reward differences to generate expectations about each other which in turn affects their behavior in terms of participation and influences task decisions and outcomes. These expectations are socially constructed over time and constitute part of the cultural beliefs of an individual. Since these expectations are part of the shared beliefs they are perceived as stable representations of reality.

The early theories can be traced to the 1950s to the work done by Berger and others on how inequalities arise among members of a homogeneous group. Research demonstrated that status distinctions among members generated differences in behavior even when these distinctions were not pertinent to the task. These differences in status or the prestige attached to one's position in society act as an "organizing process" where "…evaluations and beliefs about the characteristics of actors become bases of observable inequalities in face-to-face interaction" (Wagner and Berger, 1997, p.3). Berger et al. (1977) provide four conditions for application of

the status characteristics theory- "group members must be task oriented; they must expect that some characteristic is instrumental to that solution; the task is valued; and group decisions are collective" (p.37). Central to the status expectation theory is the distinction between specific and diffuse status characteristics (Berger, Cohen and Zelditch, 1966, 1972). This distinction is dependent on the expectations for performance that are associated with each. Each diffuse status characteristic, such as race or gender or educational attainment, is associated with expectations that are applicable to a wide range of situations. On the other hand, each specific status characteristic, such as mathematical ability or reading ability or musical ability, is associated with specific expectations for the performance of the particular activity suggested by the characteristic itself (Sell et al., 2004; Thye et al., 2006).

Those whose performance is expected to be higher are predicted to receive more opportunities to perform, to perform more often, to be evaluated more positively, and to have greater influence over the group's decisions. Thus, broader beliefs and shared expectations affect behavior such as rate of participation in group discussion and influence over the outcomes.

A revised status expectations theory was presented by Berger and Fisek in 1974 to explain how multiple status characteristics operate within a task situation, especially when the multiple status characteristics differ from one another in terms of their implications. The existence of these multiple characteristics is termed as status inconsistency. The revised theory argues that actors combine the information from all salient status characteristics in forming their expectations states. Thus, status distinctions that are derived from culturally shared beliefs that have acquired stability over time come to influence behavior in small task groups. As demonstrated by the revised theory, identity categories such as race, gender, class need not

overlap neatly with particular beliefs. Attitudes are influenced by culturally shared beliefs and expectations and these shape as well as are shaped by identity categories.

Shelly and Webster (1997) in their analysis of the emergence of social structure within informal task groups add two more processes that govern this process in addition to status generalization. These two processes are that of formal position and sentiment. Formal position such as that of a group leader produce inequalities within the group since these positions accord certain rights and privileges to the individual. "Sentiment structure" or the "patterns of liking and disliking" also act to structure interaction. These factors affect opportunities and influence. For instance, a liked person may be provided with more opportunities to speak and may also exercise more influence, or a group members may defer to a liked person rather than a disliked person in case of disagreements. These factors lead to those with "socially disfavored states of characteristics" contributing less and having less influence in a task situation (p.86).

2.8 Research Questions

The diversity of participants implicitly implies a diversity of viewpoints, each of which has to be heard, considered, and engaged with in order to come to a decision. Persuasion is central to the process of consensus building as claims are presented and discussed. As deliberation unfolds, what may be a minority opinion (held by a numerical minority of participants) may ultimately emerge as the majority opinion (held by a numerical majority of participants) on account of various reasons. The process of reaching consensus is one where influence comes into play. The dynamics of deliberation, therefore, reflect the different sources of influence that are brought into play.

Influence becomes a matter of concern when it is exercised by those who have always had a say in decision making. The format of consensus conference is devised to guard against such an occurrence by providing all participants with equal access to information in the form of background materials; the use of facilitators whose task is to ensure an equitable discourse; and a space for dissent within the mandatory final, consensus report. But do these elements work in their intended way? All these factors can derail the deliberative process if they affect equality and inclusion. The format of consensus conferences is geared towards not just informing the participants but also ensuring that they have equal access to resources so that all participants are equally advantaged. But how does this ideal play out in actuality? As Rayner (2003) states, the "key assumptions about ideal free speech may mask the realities of indifference, politics, and power that characterize real communities" (p. 165). Equitable and inclusive discourse may be difficult to achieve in practice. Individuals and groups can tend to dominate the discussions leading to power imbalances with the outcomes reflecting the values and interests of the dominating stakeholders (Pelletier et al., 1999). Do the elements of the format unintentionally influence the process such that the process and outcome is no longer inclusive? What are the sources of influence that come into play as the participants strive to achieve a consensus? By focusing on the talk within the consensus conference, I hope to answer my research questions that are mentioned in Chapter 1.

1. How do status characteristics (ascribed and achieved) such as gender, race, education, income, and expertise affect the deliberative exercise?
2. How does the format affect the deliberative process? Did the NCTF create conditions which promoted open and inclusive dialogue?
3. Was the process inclusive?

2.9 Description of Variables

The dependent variable is deliberation defined in terms of its aspect of inclusion. Inclusive deliberation is both external and internal. External inclusion can be measured by diversity or presence- the degree to which a wide variety of citizens and viewpoints are present. Internal inclusion refers to the structure of the deliberation- the extent to which less powerful concerns are voiced and heard. "Inclusivity relates to both presence and voice: in principle all citizens are entitled to participate in the process of political dialogue and have an equal right to introduce and question claims, to express and challenge needs, values and interests" (Smith and Wales, 2000, p.53). In addition, participants should also acknowledge and engage with the perspectives of the others leading to learning. Effective deliberation requires an acknowledgement as well as an affirmation of the presence and voice of others. Reciprocity and reflexivity are also measures of inclusion; throwing light on the extent to which voices are heard. Thus, inclusion is denoted by presence and voice and the opportunity to be heard. I hypothesize that internal inclusion will be affected by status, expertise and experienced facilitation. In order to understand inclusion within deliberation, my research tests the following hypotheses.

2.10 Hypotheses

A. **Inclusion as measured by presence:**

In order to study inclusion in terms of presence, I use the demographic data from the survey to look at the diversity of the group. In addition, I also use the information from the transcripts to understand the diversity of participants in terms of the range of concerns within each group

H. 1.1: The rules of engagement pertaining to recruitment will lead to the presence of a diversity of participants.

B. Inclusion as measured by voice:

With regard to inclusion as defined by voice; based on the expectations state theory, I hypothesize that the less powerful members will contribute less to the deliberations as compared with the more powerful members. Also, the facilitators will have to intervene and elicit the views of the less powerful members in order to ensure equality in speaking time. However, the experience of the facilitators will be a factor in how sensitive they are to inequality in speaking time, if any. In addition, the less powerful members of the group will use more narrative statements during the deliberation than the more powerful members. The use of narrative reasoning is a feature of everyday deliberation (Dutwin, 2002; Davies et al., 2006). However, education and knowledge are some variables that have been shown to be linked to complexity of discourse. The topic of deliberation also has an influence on the reasoning offered with regard to opinions. The more powerful groups may draw upon their education, life experiences, or/and profession to offer justifications that are based on facts or on rules of logic while the less powerful may only have their personal experience to draw upon in their reason giving. Again, in light of the topic which is of scientific complexity, I hypothesize that more of the less powerful members of the group will draw upon narratives and anecdotes in their reasoning than the more powerful members. In the context of the topic, those participants who are perceived to have specialized knowledge will be accorded more speaking time and will be interrupted less than non-experts, in accordance with expectations state theory. Finally,

due to the absence of social cues in internet deliberation, less powerful members of the group will contribute more to the internet component of the process.

1. **Status**

   H 2.1: The facilitators will have to intervene more to get the less powerful members to introduce claims in the face to face deliberations.

   H 2.2: The less powerful members will contribute less to the internet deliberations

   H 3.3: The less powerful members will use more narratives and personal experience statements than the more powerful members.

2. **Expertise**

   H 4.1: Participants perceived as experts, that is, as having specialized knowledge of the field, will be speak more than those perceived to be non-experts.

   H 4.2: Participants perceived as experts, that is, as having specialized knowledge of the field, will be interrupted less than those perceived to be non-experts.

   H 4.3: In cases of status inconsistency, the achieved credentials (perceived ability) of participants will outweigh their ascribed characteristics.

3. **Facilitation**

   H 5.1: The more experienced facilitators will be able to better ensure equality of speaking time

   H 5.2: The more experienced facilitators will include more participants in the discussion.

C. Inclusion as measured by being heard

The more powerful members will also have more influence on the group due to their perceived status and expertise.

1. **Status :**

   H 6.1: The claims and concerns of the less powerful members will be debated less than those of the more powerful members if they differ from those of the more powerful members.

   H 6.2: The final recommendations will reflect more the concerns of the powerful members.

2. **Expertise:**

   H 7.1: The information provided by the experts during the internet sessions will form a predominant part of the second face to face session.

2.11 Definitions

Inclusion in deliberation has been defined as one of the factors that constitutes good deliberation; the others being equality, reciprocity, respect and honesty. Inclusion is both external and internal. Deliberation should be open to all that are affected by the decision and it should allow offer equal opportunities to all to be heard as well as the respectful consideration of all viewpoints. The inclusion of minority groups and minority opinions is especially important in plural societies where the wider concept of social inclusion emphasizes the full participation of all citizens in all aspects of society including decision making. A multi-dimensional and relational process, the concept of social inclusion refers to the existence of substantive equality and the accommodation of differences. Burchardt et al. (1999, p. 231) define individuals or groups as socially excluded if they do not participate in the “normal activities” of citizens in a society. These normal activities are consumption activity (equivalent to traditional measures of

poverty), savings activity (such as pensions, savings, and home ownership), production activity ('engaging in an economically or socially valued activity, such as paid work, education or training, retirement or looking after a family'), political activity ('engaging in some collective effort to improve or protect the immediate or wider social or physical environment') and social activity ('engaging in significant social interaction with family, or friends, and identifying with a cultural group or community').

In this study of inclusion within a participatory process, I use the terms "less powerful" rather than minority or marginalized group. The concept of citizen participation is about granting more power to the public in the decision making or policy process. Not just the concept but also the participatory space is imbued with power. As stated by Cornwall (2002),

> Spaces in which citizens are invited to participate, as well as those they create for themselves, are never neutral. To make sense of participation in any given space, then, we need also to make sense of the power relations that permeate and produce these and other spaces (p.8).

The concept of power has been dealt with in a large body of work; different theorists emphasizing different aspect of this varied concept. An influential theory has been Giddens' concept of power based on his structuration theory that emphasizes both agency and structure and the relational nature of power. Giddens (1984) defines power as 'the capacity to achieve outcomes' (p.257),

> Power within social systems that enjoy some continuity over time and space presumes regularized relations of autonomy and dependence between actors or collectivities in contexts of social interaction. But all forms of dependence offer some resources whereby

those who are subordinate can influence the activities of their superiors. This is what I call the dialectic of control in social systems. (p.16).

Giddens views power both as "transformative capacity" and as "domination". His concept emphasizes the dynamic nature of power. Resources are both allocative or material, and authoritative. They are "structured properties of social systems, drawn upon and reproduced by knowledgeable agents in the course of interaction. … Resources are media through which power is exercised, as a routine element of the instantiation of conduct in social reproduction" (Giddens, 1984, p.15-6). These resources, that actors draw upon to exercise power, are not evenly distributed. Individuals differ in their control of resources that they can use to influence the activities of others. However, power is never one-directional as even the most subordinate agents also have some access to these resources that they can use to influence others.

My application of the categories of "more powerful" and "less powerful" is based on the extent of access that individuals have to material, economic, social, and intellectual resources. Power depends on resources that come in different forms and their efficacy varies from context to context as well as with objective (Jenkins 2009). For Tilly (1977), resources are the assets that help groups influence other groups, they are not synonymous with power and neither are they the same across situations. Power is the "extent to which the outcomes of the population's interactions with other populations favor its interests over those of the others; acquisition of power is an increase in the favorability of such outcomes, loss of power a decline in their favorability…" (pgs. 3-5). Ilchman and Uphoff (1969); and Uphoff (1989) in their study of collective action and power identify six kinds of resources-economic resources, social status, information, physical force, legitimacy and authority.

Some of these resources such as physical force, authority, and information do not come into play due to the nature and format of consensus conferences. There is no role for coercive power in deliberation and since the participants are average, non-expert citizens, there are theoretically no imbalances of informational resources or of authority. In this research, I focus on economic resources and social status as measured by income, education, race and gender. The presence of participants who had specialized knowledge also revealed the importance of expertise as a resource. Expertise can also be viewed as a form of informational resource, and its presence brings up the problematic relationship of experts and non-experts in science and technology policy making as well as the contentious issue of who has legitimacy in the decision making process. Instead of using the binary categories of powerful and powerless, I use the categories of "more powerful" and" less powerful" to capture the dynamic nature of power and the combination of autonomy and dependence. Therefore, the term less powerful is used for those with lower income, those with less education, those who are minorities and those who are women.

The use of these categories is also closely associated with the concept of status inconsistency. Status inconsistency refers to that state when an individual holds differing positions that have different degrees of prestige across hierarchies. Not all status positions may be relevant in a particular social interaction. It is the context of the social interaction that determines which status positions become salient (Zimmerman, 1985). Depending on the context, an individual's power and influence may be based on a particular position that draws on a particular set of resources. In the analysis, I keep in mind the existence of status inconsistency and the different saliency of status characteristics in the context of the deliberations. In the next

chapter, I describe the NCTF process and its policy context before I move on to analyzing the manner in which these resources had an effect on inclusion.

CHAPTER 3

THE NATIONAL CITIZENS TECHNOLOGY FORUM ON NBIC TECHNOLOGIES FOR HUMAN ENHANCEMENT (NCTF)

3.1 Introduction

The National Citizens Technology Forum (NCTF) on NBIC technologies for human enhancement was held in March 2008 in six cities across the US. Based on the Danish consensus conference format, the NCTF brought together informed citizens and experts to discuss the use of NBIC technologies for human enhancement. NBIC technologies refer to the convergence of nanotechnology, biotechnology, information sciences and cognitive sciences. Before discussing the NCTF, I will describe the consensus conference format and its diffusion. After presenting the policy context for the NCTF, I will provide a description of the NCTF. The chapter concludes with a description of the methodology used in the dissertation.

3.2 The Danish Consensus Conference Format

The institutionalization of the practice of technology assessment has its origin in the U.S. The Office of Technology Assessment (OTA) was established in 1972 and was the first such institution set up to aid the legislature with S&T policy matters. During the 1980s, a number of European countries such as Denmark, Germany, and the Netherlands set up parliament technology assessment agencies based on the OTA. After the OTA was closed in 1995, most of the innovations in participatory technology assessment such as scenario workshops, consensus conference and deliberative mapping arose in these countries (Sclove, 2010).

The Danish Board of Technology (Teknologinaevnet) was established in 1986. It is an independent institution connected to the Danish Parliament or Folketing. In 1995 the Board of Technology became an independent institution with the following purposes:

1. To follow technological developments;
2. to carry out investigations and comprehensive assessments on the possibilities and consequences of technology for society and the citizen;
3. to initiate independent technology assessments; and
4. to communicate the results of the work to Folketinget, to other political decision makers in society, and to the Danish population in order to support and further public debate on technology. (Kluver, 2000, p.174)

The structure of this institution was inspired by the U.S. Office of Technology Assessment (OTA). The DBT was connected with the Danish Parliament and was to operate as a research and analysis wing but it differed from the OTA in that the public had a much larger role to play. The Danish tradition of public debate and public enlightenment formed the basis of this form of technology assessment (Andersen and Jaeger, 1999; Grundahl, 1995; Kluver, 2000; Horst and Irwin, 2010). The Danish Board of Technology, under its legal mandate, was required to use those methods of technology assessment that involve representatives of the public or ordinary citizens. An important method of participatory technology assessment that has been developed by the Danish Board of Technology is the consensus conference. The consensus conference method itself was a modified version of the original US consensus conference that brought together panels of experts to arrive at a consensus on research findings. Denmark took this consensus model but incorporated a lay citizen panel in dialogue with experts. The first consensus conference was held in Denmark in 1987.

The consensus conferences are held on a topic that is of social concern and involves a complexity in that ethical and value judgments are intertwined with social concerns and technical issues. The Danish Board of Technology appoints a steering or advisory committee to oversee the organization of the consensus conference. A random sample of citizens is drawn and about 15 participants are selected to be the lay participants, or participants that have no specific interest in the topic. The DBT defines participants as "(…) lay people without any specific relationship to the subject of the conference. In other words, they do not have any special prior knowledge or qualifications as regards the subject area. Citizens contribute by making their views known in the form of visions, concerns, values, holistic appraisal and everyday experiences."[3] The participants are broadly representative of the population of the country but the sample is not a statistically representative one. It is representative of the demographics of the country. The panelists meet with each other over two weekends before the start of the public forum that is open to all. During these preparatory meetings they go over the information packet/ background material prepared by the DBT. This information has been vetted by the steering committee and covers a wide variety of issues around the tropic. The group also prepares a series of questions that are put to an expert panel during the public forum. Based on these questions the DBT draws a panel of experts who participate in the public forum. The public forum lasts four days, the first two of which involve the participants interacting with the experts while the final two days are spent writing the report based on a consensus among the participants. A basic principle guiding the work of the DBT is that "…technology assessment should include the wisdom and experience of ordinary citizens/lay people; integrate the knowledge and tools of experts; respect the political processes and the working conditions of policy-makers; and build on the democratic tradition in Denmark" (Kluver, 1995, p.41).

[3] http://www.tekno.dk/subpage.php3?article=468&toppic=kategori12&language=uk

Another important part of the process is that a facilitator works with the panel of citizens. The facilitator is a non-expert on the topic but has expertise in facilitation, either training or experience or both. He or she should have no interest in influencing the participants but must possess the skills to manage a heterogeneous set of people to work together. The facilitator manages the preparatory meetings as well as chairs the conference. The facilitator assists the panel in preparing the final report by focusing their attention on the key questions to be answered. The project manager and the facilitator work closely during this process, with the facilitator playing an important role in managing the process (Grundahl, 1995).

Mayer and Geurts (1996) describe the topics for which this method of public participation is particularly suitable as: "1) being of current interest and growing importance in the future; 2) controversial: the issue involves a mess of political, social, and ethical aspects; 3) complex: the issue requires scientific and expert clarification; 4) multiple interests involved: i.e. they involve unresolved issues and interest positions with regard to new technology in society" (p. 236-237). According to the DBT, "consensus conferences are suitable in connection with: a topic of current social relevance; regulation requiring public support. The method is also suitable when there is a need for further public awareness and debate; there is a need to identify attitudes and objectives; there is a need for public input."[4] Consensus conferences in Denmark have been held on varied topics such as "How can we assign value to the environment? (2003); Testing our genes (2002); Road pricing (2001); Electronic surveillance (2000); Genetically modified food (1999) ; The Consumption and Environment of the Future (1996); The Future of Fishing (1996); Gene Therapy (1995)".

[4] http://www.tekno.dk/subpage.php3?article=468&toppic=kategori12&language=uk

3.3 Diffusion of the Model

While the consensus conference developed in the particular context of the Danish tradition of "people's enlightenment" and its participatory political culture the format has successfully diffused to many countries with different political contexts. Since the first consensus conference in 1987, the consensus conference model has travelled across countries and continents. [5]

As consensus conferences have proliferated so has the research evaluating their suitability in all political and cultural contexts (Mohr, 2002; Nishizawa, 2005). The evidence provided by this body of research does not bring up any winners in this argument. Can a uniform deliberation model based on the Habermasian public sphere be adopted in all contexts, irrespective of the local culture, systems of governance and styles of decision making? Some previous studies on the consensus conference model suggest that the participatory deliberation model "travels well" (Einsiedel et al., 2001) and can be applied in different national contexts. Other studies claim that the national context determines the effectiveness of the model. Dryzek and Tucker (2008) find that the type of political system has an important impact on the potential of deliberations and their policy impact. In a comparative study of consensus conferences on the issue of genetically modified food in Denmark, France, and the United States, the authors focus on the manner of establishment, perceived legitimacy, policy impact and influence of the consensus conference in each country. The consensus conference, as a model, need not be effective in all national contexts. Consensus conferences have also been evaluated in a cross national perspective. Nielsen et al. (2007) look at three consensus conferences on GMOs, which took place in France, Norway, and Denmark. The authors argue that the interpretations of the

[5] A list of consensus conferences from across the world is available at the website of the Loka Institute http://www.loka.org/TrackingConsensus.html

concept of participation; the value attributed to lay knowledge; and ideas about the role of the layperson, vary from country to country leading to different ideas about what constitutes legitimate goals for participatory processes. Existing evaluations of consensus conferences tend to focus on the modes of organization as well as the outcomes of the conferences they examine and assume that this method has universally agreed goals and therefore can be applied across national boundaries.

3.4 The National Citizens Technology Forum

3.4.1 The Policy Context

The term "nanotechnology" refers to the design or manipulation of structures and matter at a scale of 1 to 100 nanometers (or billionths of a meter). What creates a certain unpredictability with regard to nanotechnology is the fact that at this scale the properties of matter undergo a fundamental transformation behaving differently than at the "normal" scale. Nanotechnology is also referred to as a converging technology; it brings together developments in the fields of biotechnology, cognitive science and information technology making it a complex, interdisciplinary field. The complexity and unpredictability make it a classic "post-normal" science. As nanotechnology develops there are both naysayers and optimists in the debate around the potential of nanotechnology. Nanotechnology has been hailed as a transformative technology that will usher in a new era or a new industrial revolution (European Commission, 2004; Roco and Bainbridge, 2001). On the other hand, there are increasing concerns about the environmental, social and ethical effects as well as the regulation of this technology.

The policy context of the research and development of nanotechnology is interesting in that legislation in the US has created a role for technology assessment and for integrating a social science perspective with the research activities. An important milestone in the development of nanotechnology was the launch of the U.S. National Nanotechnology Initiative (NNI) by President Clinton in his FY2001 budget request to Congress. From FY2001 through FY2011, Congress appropriated approximately $14.2 billion for nanotechnology research and development (R&D).[6] In 2003, Congress provided a statutory foundation for some of the activities of the NNI through the 21st Century Nanotechnology Research and Development Act of 2003 (P.L. 108-153). This legislation puts into law programs and activities supported by the National Nanotechnology Initiative (NNI), which is a multi-agency R&D effort. The act established the National Nanotechnology Program (NNP). One of the activities of the National Nanotechnology Plan is "ensuring that ethical, legal, environmental, and other appropriate societal concerns, including the potential use of nanotechnology in enhancing human intelligence and in developing artificial intelligence which exceeds human capacity, are considered during the development of nanotechnology by (A) establishing a research program to identify ethical, legal, environmental, and other appropriate societal concerns related to nanotechnology, and ensuring that the results of such research are widely disseminated; (B) requiring that interdisciplinary nanotechnology research centers established under paragraph (4) include activities that address societal, ethical, and environmental concerns; (C) insofar as possible, integrating research on societal, ethical, and environmental concerns with nanotechnology research and development, and ensuring that advances in nanotechnology bring about

[6] Report of the Congressional Research Service. Sargent , J.F. (2011) The National Nanotechnology Initiative: Overview, Reauthorization, and Appropriation Issues. http://www.ieeeusa.org/policy/eyeonwashington/2011/documents/TheNationalNanotechnologyInitiativeOverviewReauthorizationandAppropriationsIssues.pdf

improvements in quality of life for all Americans; and (D) providing, through the National Nanotechnology Coordination Office established in section 3, for public input and outreach to be integrated into the Program by the convening of regular and ongoing public discussions, through mechanisms such as citizens' panels, consensus conferences, and educational events, as appropriate".[7] The act explicitly calls for integrating societal, ethical, and environmental concerns with R&D activities as well as integrating public input.

In 2005, funding from the National Science Foundation helped create the Center for Nanotechnology in Society at Arizona State University (CNS-ASU) "to pursue scholarship on and methodological and theoretical approaches to the social studies of nanotechnology". The guiding conceptual goals of CNS-ASU are two-fold,

> …to increase reflexivity within the nanotechnology enterprise and to increase society's capacity to engage in anticipatory governance of nanotechnology and other emerging technologies. "Reflexivity" refers to the capacity for social learning that informs about the available choices in decision making about nanotechnology. This reflexiveness can signal emerging problems, enabling what we call anticipatory governance – the ability of society and institutions to seek and understand a variety of inputs to manage emerging technologies while such management is still possible. Through this improved contextual awareness, we can help guide the path of nanotechnology knowledge and innovation toward more socially desirable outcomes and away from undesirable ones.[8]

Reflexivity refers to awareness by researchers and scientists of the kind of decisions they are making in their work, decisions that impact society. These goals are manifest in the kind of technology assessment done at CNS-ASU- Real Time Technology Assessment (RTTA). This

[7] http://www.gpo.gov/fdsys/pkg/PLAW-108publ153/pdf/PLAW-108publ153.pdf
[8] http://cns.asu.edu/about/

type of technology assessment aims at developing a more reflexive research environment and enterprise by adopting four methods- "development of analogical case studies utilizing past cases for anticipating the forthcoming social-technical interactions; mapping the resources and capabilities of the innovation enterprise to identify players, developments, organizations, and trends; eliciting and monitoring changing perceptions and attitudes among stakeholders; and undertaking participatory assessments of potential impacts" (Guston and Sarewitz, 2002). One of the projects of CNS-ASU was the National Citizens Technology Forum (NCTF), a citizens' deliberation project on the use of NBIC technologies for human enhancement.

3.4.2 The Design of the NCTF

The NCTF was designed as a deliberative forum based on the Danish consensus conference project. The Citizen Technology Forum is a modified version of the consensus conference developed by a team of research scholars at North Carolina State University for use in the American context (Hamlett, 2002). This adaptation includes interaction over the internet as an additional component to the original format which allows participation by multiple groups across the country. In an earlier study, the researchers at North Carolina State University had conducted two parallel consensus conferences on the same subject (genetically modified foods) and involving the same experts. The two differed in that while one involved face to face interaction among the participants; in the other, the interaction was web based. In line with the consensus conference format, there was an oversight committee, a facilitator, and participants were provided with background materials. The evaluation of this research project revealed that the internet was an effective medium for deliberation. After this project, the research team continued to refine the format with the aim to utilize it on a national scale (Hamlett, 2002).

While developing this format, the research team has always been conscious of the perils of polarization cascades within deliberation. Polarization cascades occur when the minority opinion holders within a group adopt the position favored by the majority at the conclusion of the deliberations. This shift in position is undesirable because it occurs not due to persuasion by the "better" argument but due to reasons such as lack of confidence in their opinions, unfavorable social comparisons or because of their numerical disadvantage (Sunstein, 2005). The research around the CTF has always paid attention to the occurrence of polarization cascades and utilized data from participant pre and post surveys to study their occurrence (Hamlett and Cobb, 2006). The design and process elements that have been found to be helpful in containing polarization effects are- the incorporation of a diversity of viewpoints within the background materials so that one particular position is not espoused; recruiting a diverse group of participants that bring varied viewpoints, experiences, and perspectives to the discussion; and a trained facilitator who can "(i) minimize personal and social distortions; (ii) give everyone who wanted to be heard multiple chances to speak (or write); (iii) keep the groups focused on specific tasks; and (iv) encourage panelists to deal with everyone's various positions honestly and fairly" (Hamlett and Cobb, 2006, p. 634). These factors were important elements of the NCTF design.

The research team at North Carolina State University and CNS-ASU were the national organizers of the NCTF. The NCTF project goals were,

> Generate *informed, deliberative public opinion* about how to manage the technologies of human enhancement for elected officials, government policy makers, business leaders, etc., who will be making the important decisions about these technologies

Demonstrate that average, non-expert citizens can understand even quite complex issues and, if they have adequate information, they can come to sensible, informed judgments about those issues

Provide information to other concerned citizens about techniques like this one, that can enhance the abilities of ordinary citizens to help shape public policy on important issues.[9]

In March 2008, the National Citizens' Technology Forum (NCTF) on NBIC technologies was held at six locations across the country. The six locations were different research universities. The organization of the NCTF was based on a hub –and-spoke structure with North Carolina State University (NCSU) at the center and the six sites forming the spokes. The organizers at NCSU coordinated the overall project, including the online components and oversaw the data gathering and survey analysis elements. NCSU was also responsible for recruitment of the experts and facilitating the internet deliberations. The recruitment of participants was a shared effort. Advertisements in local newspapers were placed by the central organizers who also received the responses from individuals interested in participating. These applicants were administered a short survey which acted as an initial sorting of participants. A compiled list of the remaining applicants was forwarded to the local organizers who then contacted a pool of participants based on the demographic diversity of the area. However, each site was responsible for facilitating, coordinating and conducting their deliberative exercise.

The selected participants were sent the background materials by mail. It was expected that they would read these before the start of the deliberations. The first face to face (F2F) meeting of the NCTF took place over the weekend of March 1 and March 2, 2008. Following this face to face meetings, the participants took part in nine sessions of internet based or keyboard-to keyboard (K2K) deliberations lasting two hours each. During these internet

[9] From the project website http://www4.ncsu.edu/~pwhmds/

sessions, the participants interacted with the experts. The last face to face deliberation was held over the final weekend of the month, March 29 and March 30, 2008. This weekend was devoted to writing the final report containing a set of recommendations. In addition to the applicant survey, the participant were also administered a pre- and post-survey. The next few sections of the chapter provide details of the components of the process.

3.4.2.1Applicants and participants

Consensus conferences do not seek to have a statistically representative sample of the population as participants but seek broader participation so that a variety of views are brought to the deliberations. The NCTF participants were not strictly a representative sample but were selected to ensure a demographically diverse group in terms of race, gender, income and education levels, political ideology and party affiliation. There were 72 participants (86 to start with but attrition reduced the numbers to 72 by the second face to face weekend) with a median age of 39 and a majority of them had a college degree or graduate degree. Participants were required to have internet access in order to participate. The newspaper advertisements eliciting participants stated that participants were wanted for a" university research project on-Public Deliberation on Enhancement of Human Abilities through Nanotechnology". Because of the time commitment involved (two full weekends of face-to-face (F2F) meetings and 18 hours of Internet, or keyboard-to-keyboard (K2K) interaction) participants were paid $500.

3.4.2.2 The Background Materials

All the participants received a sixty-one page background document in the mail to read prior to the first face-to-face (F2F) sessions. The document, describing the emergence of NBIC

technologies, the issue of human enhancement and the various debates about their anticipated social impacts, was drafted by researchers in CNS-ASU and following the Danish pattern, it was reviewed by an oversight committee that consisted of Ida-Elisabeth Andersen (project manager for the Danish Board of Technology) and David Rejeski (director of the Project on Emerging Nanotechnologies of the Woodrow Wilson International Center for Scholars in Washington, DC). The background material also incorporates scenarios that were developed at CNS-ASU using a collaborative format involving scientists and the public which present "plausible and collectively produced futures". The background materials clearly stated that, "the following fictional scenes are extrapolations from current nanoscale research; they have been vetted for their technical plausibility by scientists currently working in nanoscale research. We hope these scenes will stimulate you to reflect upon the meanings, potentials and problems surrounding nanotechnology. The goal is to cultivate our collective ability to govern the implications of our technological ingenuity."[10] There were six such scenarios: engineered tissue ("Using tissue printing technology, this system is able to build tissues with a vascular structure enabling the building of new organs"; bionic eye ("Opti-scan is an optical implant that looks and functions like a normal eye, yet has new enhancements enabling magnification, visualizing infra-red, and night vision"); disease detector (or "Doc in the Box is a device that tracks an individual's protein levels to monitor changes that imply early stage illness or disease before symptoms emerge"); healthy chip ("the Healthy chip Network System, available to patients through their doctors, can not only continuously monitor chemical deficiencies or saturations within the body, but can deliver medicine before the patient is even able to recognize any physical symptoms"); brain chip ("cranial chip features a data feed that puts information into the brain while the user is resting"); barless prison ("NanoCage has developed a caged drug that is injected into prisoners

[10] http://www4.ncsu.edu/~pwhmds/BackgroundMaterials.pdf

that becomes activated by radio control if prisons cross designated boundaries"). The background document is available at http://www4.ncsu.edu/~pwhmds/.

Participants were expected to have read the background materials ahead of the first weekend so as to have some knowledge of the topic before the start of the deliberations.

3.4.2.3 Facilitation

Each site was managed by its own organizers and facilitators. Often the two roles were combined in one. The face to face sessions were facilitated by two facilitators at each site. The facilitators were faculty, researchers or graduate students and had varied experience in facilitation. These sessions were of approximately 6 hours and included breaks for lunch and tea. All sites broadly followed the same format for the face to face interactions though there was considerable leeway in how each group of facilitators managed their process. The first face to face weekend was spent articulating initial concerns and reactions to the background materials, highlighting developments that participants thought exciting, as well as formulating questions for the experts who interacted with the participants during the internet sessions. The last weekend was spent in discussing questions and concerns in light of the internet interactions and on writing the final report. The participants at each site wrote their own final report with the help of the facilitators. The final report was formulated through a process of consensus and contained policy recommendations that all panelists could endorse.[11]

3.4.2.4 The First Face to Face Weekend

The face to face interactions were managed by the local organizers and facilitators but they followed the same broad outline. On the first day of the face to face interaction, the

[11] The final reports from all six sites are available at http://www4.ncsu.edu/~pwhmds/final_reports.html

facilitators introduced the process and explained what the expectations from the participants were. The rules for managing the deliberation were explained and in some cases, the participants were asked to frame their own rules. The participants were asked to share their initial thoughts about the background readings as well as their initial concerns, excitements and questions. The rest of the time of the first face to face interaction was spent in categorizing and prioritizing these concerns and questions. The participants also framed a set of questions to ask the experts. The facilitators made use of jumbo post-its, whiteboards and screens to help organize the categories of concerns and questions. In addition, they also wrote up notes of the discussion/ list of priority concerns etc. that were emailed to all participants at the end of each day.

3.4.2.5 The Internet Sessions and the Experts

The first face to face session was followed by nine internet or K2K (keyboard to keyboard sessions), lasting two hours each held in the evening on weekdays. During the internet sessions the participants from all six sites were grouped into different teams, with each team having members from all the sites. The first few sessions were spent voicing the concerns and initial reactions of all the teams so as to uncover the commonalities across all six sites. Later sessions had the content experts joining in to answer the questions of the participants. Having a variety of experts from different field is another mechanism to ensure that participants are exposed to diversity of viewpoints making for effective deliberation. The NCTF experts, five in number, were all from academia and research and were specialists in varied fields such as, "the legal, ethical, and policy implications of life sciences research and biotechnologies; cortical neuroprosthetics; federal regulation of medical technology; and philosophy of science and bioethicis"; the fifth expert was the "Executive Director of the Center for Biological and

Environmental Nanotechnology" (Hamlett et al. 2008). The experts were also paid $1000 for participating in the NCTF.

Participants had been asked to formulate a list of questions for experts during the first face to face weekend that were then forwarded to the national organizers so that they had an idea of the specialty area from which to draw the experts. A limited number of questions from these lists were also provided to the experts so that some of these questions could be replied to ahead of the internet interaction.

The internet deliberation allowed people to interact without knowledge of the characteristics of participants from other sites except their gender. (Participants signed in using their first name, initial of last name, and state abbreviation as in, Jane D GA). Also, the moderators had strong control over the interaction process. The online interface that was used for the internet sessions is "Elluminate Live". The software used allowed certain groups to be "chat alive", that is, they could chat and interact with each other while the rest could observe their interaction but could only send messages to the moderators and not to the entire group. The participants could either address their messages to the whole room, to the moderators or to specific other participants. The moderators also had priority in the posting of messages so they could intervene to direct the conversation if they thought it was wandering off topic. These sessions were facilitated by a professional moderator and the NCTF program organizers from North Carolina State University. The discussions from each online session were archived and available to all participants after each session. A detailed description of the interface is available in Delborne et al.'s (2011) paper evaluating the online component of the NCTF.

The first three sessions were spent with the participants recounting the priority concerns and issues and summarizing the discussions at their individual sites. During the next three

sessions the participants again formulated questions for experts. The long list of questions generated by each group was reduced to a list of five questions per group using a process of voting. The experts joined in the last three sessions to answer these and other additional questions posed by the participants.

3.4.2.6 The Second Face to Face Weekend

The participants met for the second face to face weekend after the conclusion of the internet sessions. During the first session of the weekend participants were asked about their reactions to the internet sessions and the experts. In the next session the participants again discussed their priority concerns in light of what they learned from the internet sessions. The last few sessions of the weekend were spent discussing and writing the recommendations and the final reports. The facilitators, as during the first weekend, made notes of the day's discussions and circulated them among the participants at the end of the penultimate day of the weekend.

3.4.2.7 The Final reports

Each site formulated their final report during the last face to face session.[12] The participants formulated the reports on the basis of consensus and none of the six reports contain a dissenting note. The final report of the project (Hamlett et al., 2008) contains information on the final reports of all sites. The recommendations from the six sites have been categorized and reveal that the major areas of concern of the participants were- regulatory adequacy, public information, access and equity, funding accountability, safety, entrepreneurship and development, ethical considerations, privacy, health insurance, military uses, environmental impacts, and rights (p.7).

[12] All the six final reports can be accessed at the project website http://www4.ncsu.edu/~pwhmds/final_reports.html

3.5 Research Sites

In my dissertation I look at the deliberative talk at two the NCTF sites- Site A and Site B. I was a graduate research assistant for the project at one of the sites. I did not take part in the facilitation but was present in all the face to face sessions as well as online.

Site A was one of the most diverse of the six sites in terms of the demographic characteristics of the participants. These are also quite similar to the demographic characteristics of the whole group of participants. The panel at Site B, on the other hand, was composed of a much smaller number of participants and their characteristics deviate from those of the mean. Empirical research shows that gender composition of a group plays a role in group dynamics as well as in how risks are perceived. Thus, I hypothesize that the sources of influence will play out differently in these two cases as the size and the demographic makeup of the groups is different. An additional factor is that the facilitators at these two sites were also diverse in their status characteristics and experience. In addition to status differences that are perceptible to the eye, another distinction that the participants were aware of was that of occupation. During the beginning of the first face to face session, most participants included their occupation as part of their introductions.

There were 13 participants in Site A and 9 in Site B. One participant in Site B dropped out of the project after the first face to face weekend. In Site A, one of the participants could not attend the last face to face weekend while another could not make it to the last day of the interaction. So there were 12 participants on the first day of the second face to face interaction and 11 on the last day of the project.

TABLE 1: NCTF Participants Characteristics

	Site A	**Site B**	**Total (all 6 Sites)**
No. Of Participants	13	9	72
Gender			
Male	54%	38%	50%
Female	46%	62%	50%
Median Age	45	46	39
Education			
High School			7%
Some College	38%	37%	30%
College Degree	31%	63%	32%
Grad School	31%		30%
Party Affiliation			
Democrat	54%	75%	44%
Republican	8%		6%
Independent	15%	12%	39%
Other	23%	12%	11%
Political Ideology			
Liberal	31%	50%	42%
Moderate	54%	38%	28%
Conservative	8%		11%
Other	8%	12%	19%
Race			
White	46%	37%	61%
Black/African-American	38%	37%	17%
Asian-American	8%	25%	6%
Native American			3%
Hispanic	8%		8%
Other			6%
Income			
<$15K	8%		11%
>$15K <$$35K	15%	25%	25%
>$35K <$50K	8%	37.5%	15%
>$50K <$75K	38%	12.5%	18%
>$75K <$100K	15%		14%
>$100K	15%	25%	17%

Source: Survey data

The format of the NCTF is valuable to the research design as it permits comparison of not only cases but also formats. The two sites are different in their composition of participants. While the Site A site conforms to the mean, the Berkley site is more of an outlier. In addition, the internet format with its elements of anonymity in terms of status characteristics of participants, a

different type of facilitation and the presence of experts, allows a comparison with the face to face deliberative sessions where participants can be clearly identified by their status characteristics.

3.6 Data

My primary data is the transcripts of the face to face interactions in Site A and Site B and of the internet sessions. The face to face sessions were videotaped at each site. The transcripts are verbatim accounts. Except for fifteen minutes of recording from Site A that could not be transcribed due to its quality, all the recordings have been transcribed. Words or portions of a sentence that were not audible are marked with close brackets. In accordance with Poland's (2002) direction, the transcripts have not been "'tidied up' to make them 'sound better'" (p. 641) but they do not have notations for speech acts such as pauses and emphasis or interaction acts such as laughter. There are approximately 700 single spaced pages of transcription of the face to face deliberations. As I mentioned earlier in the chapter, the transcripts of all the internet sessions were archived. The surveys were administered by the organizers at North Carolina State University and have been shared with all the researchers involved in the project.

In addition, I interviewed both the facilitators at Site A and Site B. I had proposed to conduct four interviews with participants at each site. However, I had a low response rate to my request for interviews to the Site B participant. I have data from interviews with two Site B participants and four Site A participants. The interviews were conducted over the telephone and permission was sought before recording them. The interviews were semi-structured and included follow up questions. The list of questions is available in Appendix. These interviews were also transcribed verbatim. Since the interviews were conducted more than three years after

the end of the project some of the participants could not remember exact details. In those cases, I focused on the information they were providing and used those as probes rather than forcing them to recall details. It may be argued that the long time period since the end of the project may affect the participants' perspectives. In analyzing the interviews I have focused on their perspective of the process and argue that these interviews convey not what they took away from the project but what stayed with them.

Additional sources of data are the background materials and the final reports of the Site A NCTF and the Site B NCTF.

3.7 Research Design

A case study design is used for the research. A case study design is appropriate for studying deliberation which is a process of interaction that is context dependent. As defined by Yin (2003), a case study "investigates a contemporary phenomenon within its real-life context, especially when the boundaries and context are not clearly evident" (p.13). The unfolding of deliberations cannot be captured by quantitative measures. A mixture of content analysis as well as a more grounded reading of the data allows for more sound conclusions regarding contributions and influence as well as the interaction between participants and with the facilitators. The Site A NCTF and the Site B NCTF are treated as separate cases. In addition, each participant is a separate case as I am also interested in the relationship of individual characteristics with deliberation in terms of their contribution and influence in the process. In accordance with the IRB protocol, all identifiers are removed and while discussing individual cases or including excerpts from the transcripts in later chapters, I use random numbers for each participant which differ in each excerpt.

3.8 Techniques of Analysis

3.8.1 Content Analysis

I have analyzed the transcripts of the deliberations and the interviews using content analysis, a method that uses a system of categories to classify the elements of a text as uniformly as possible. Krippendorff (2004) defines content analysis as "… a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (pg 18). Content analysis is particularly suited to studying social interaction as it allows for both qualitative and quantitative analysis. Krippendorrff (2004) categorizes the components of content analysis design into three- data making or creating computable data from text which involves formulation of the unit of analysis, sampling, coding, and summarizing data; drawing inferences from the contextual phenomena; and "narrating the answer to the research questions" or explaining the significance of the findings. Developing a codebook is the first step of the process of analysis.

3.8.1.1 Development of Codebook

Rourke and Anderson (2003) suggest that instead of developing new coding schemes, researchers should use schemes that have been developed and used in previous research as applying existing instruments fosters replicability and improves the validity of the instrument. In the case of content analysis of consensus conference deliberations, the literature review did not reveal any studies that have analyzed the talk within a consensus conference using content analysis. However, my analysis focuses on the deliberative talk and a number of codebooks have been designed to analyze political deliberations and online deliberative talk. These codebooks have provided an invaluable starting point to develop my codebook for this research

since there is a common focus on aspects of deliberation such as inclusivity, equal access, reflexivity and reason that remain the same across the topic of deliberation.

Stromer-Galley (2007) has developed a coding scheme to analyze the quality of political deliberation in face-to-face and online groups based on six elements of deliberation: reasoned opinion expression, sourcing (the source used to support a claim), disagreement, equality, topic (structuring topic which is the topic established prior to the deliberation and interactional topic which is established through the interaction), and engagement. Graham (2008) has developed a coding scheme to assess political talk in non-political online discussion forums. His coding scheme follows a two stage analysis, in the first phase discussion threads are analyzed to identify political talk and in the second phase the latter are analyzed to determine the normative conditions of deliberation. The second phase, in turn, is subject to a three phase analysis. In the first phase, initial and response messages were identified. In the second phase only the reasoned messages were analyzed to determine the types of evidence offered and the argument style adopted. In the final stage, the messages were coded for the variables of deliberation- "communicative empathy, discursive equality, discursive freedom, and sincerity". Dutwin's (2002) dissertation looks at the Citizen Voices/ Philadelphia Compact project in which citizens gathered in small groups to discuss political issues important to their city and develops a coding scheme to analyze the political deliberation that took place in these groups. The major coding categories in his codebook are: statement type (which may be a reality claim, a problem definition, a future vision or a solution), statement category (initial, elaboration, agreement, disagreement, qualifier, or self-continuation); focus or the level at which the claim is being made (ranging from value claims to specific policy claims); and the type of information linked to a statement type (specialized, experiential, generalized, global).

Since deliberation is defined as argumentation supported by justifications I find that Meyers and Brasher's (1998) conversational coding scheme is a useful instrument to code the deliberations. Their scheme has as its unit of analysis, "any statement that functioned as a complete thought or change of thought rather than words or turns." They define group argument as a "consensus-seeking interactions" which is aligned with what is the definition of deliberation within the consensus conference format. They develop a process model of group argument starting with disagreement as the process that causes an argument to emerge.

> The interaction consists of a set of three activities: reasoning activities that are essentially plausible argumentation which is essentially opinion-based, and is subject to retraction as the argument continues and new evidence is brought to light; convergence-seeking activities that are acts that unify and integrate the group so as to forge agreement on an idea or proposition; and finally, these primary activities are interrupted by the final category that of disagreement – relevant intrusions. These can be in the form of objections, challenges, stalemates, or conflict and their purpose is to move the discourse in a different direction. (p. 262).

These activities can be identified in the deliberative process that characterizes consensus conferences. Meyers et al. (2000) have used the version of the argument coding scheme detailed above to analyze majority-minority influence. They examine a group decision making process utilizing this coding scheme to understand the arguments constructed by the majority and minority groups and to link these arguments with the final outcome to understand minority and majority influence.

An aspect of the deliberative process that is of importance in participatory technology assessment is that of reflexivity and social learning. Reflexivity refers to the process of reflecting

on another's argument which also involves an element of empathy, of putting yourself in the other's shoes and results in learning. Largely an internal process, it is difficult to capture it by a code. I draw upon work in the area of distance education that utilizes content analysis to develop coding categories for these variables. Zhu (1996) has examined learning "as a process of social negotiation and collaborative sense making" (p. 822). She uses the categories of questioning and challenge, statements and supporting statements, reflecting, and scaffolding to study learning in a computer mediated environment. The latter two categories categorize reflexive learning. Reflecting is defined as expressing personal views or experience or reflecting on personal opinions while scaffolding is a category that is based on statements that acknowledge, include or affirm others.

Another detailed codebook has been developed by Thakur (2010) to study online deliberation among civil society groups that focuses on the use of reasoned arguments, reciprocity and reflection in online deliberation. The main categories that he uses in his codebook are- statements of agreements, statements of disagreements, general pinions/assertions, facts, reasoned arguments, narratives, questions for other members, suggestions, actions, clarifications, response incorporates ideas/opinions/assertions of other members, stated external references, and other (non-deliberative). This has been invaluable for developing the codebook that I have used in this research.

The difference between narrative and reasoned justification is an important category while examining the kind of reasoning that participants provide for their opinions and assertions. Some recent work on online deliberation has focused on story-telling and narratives. Black (2008, 2009) defines stories as "a series of connected statements in which a speaker recalls some past experience in a roughly sequential order" (2009, p.3). Polletta and Lee (2007, p.707) define

a story as composed of an orientation, a series of complicated actions and an evaluation. Narrative reasoning is an opinion or preference that is supported by a story. Non-narrative reasoning, on the other hand, uses reasons to support opinions and claims. They identify three types of reasons: "practical ("that option has worked elsewhere"), normative ("that is the fair or democratic thing to do"), or symbolic ("that option signals our commitment to freedom or environmental sustainability")" (p. 208).

The codebook with descriptions of each code is attached as Appendix A. At the first stage of coding, facilitator and participant utterances were marked separately. The participant statements were coded as per type (such as initial statement, response, interruption) and then for kind of statement (assertion, narrative, reasoned). In addition, I coded for concerns and for sources (background materials, other participant information, and expert information) as well as for amount of speaking time and number of utterances per participant. The amount of speaking time is a count measure of the number of transcript lines. Each line was coded as one as was any line greater than half.

The main categories in my coding scheme are:

1. Participant Statements: statements of assertion, emotive statements, reasoned statements, factual statements, narrative statements, reciprocity, process statements, social talk
2. Facilitator Statements: process statements, clarifications, elicitations, interventions, redirecting statements, summary statements
3. Time
4. Sources (experts, other participants, background materials)

The transcripts were also coded for concerns. These codes were not preset but arose from the text and the coding categories are based on the language that the participants used while talking of these such as ‘elimination of diversity’, ‘playing God’.

The unit of analysis is a complete thought. While developing the codebook I had proposed coding at the sentence level but revised this while transcribing the deliberations. I found that coding at thought level will be better suited as the speaking styles of participants differ. Some spoke in long sentences that often contained a number of thoughts while other spoke in short and sharp sentences. Often the sentences were run on sentences using “and”, “you know”, “so” as conjunctions.

With regard to sampling, since the transcripts of the deliberative process form a manageable set of observations and the aim of my study is the entire deliberative process, I have coded the entire transcripts of the Site A and Site B NCTF along with the internet deliberations. A combination of hand coding as well as qualitative coding software (NVivo) was used. The initial codebook was first tested on sample of the deliberations of both sites and then refined using more detailed descriptions of the codes. After the development of the initial codebook, two sections of transcripts from both the sides were re-coded. In terms of the coding categories, two of the categories were found to be problematic-reasoned statements and narrative statements which had a lower than desirable reliability score (.761 and .769) using the percentage agreement as a reliability score. The categories and the description of the codes pertaining to the type of statement were further refined. The testing of the final codebook on a sample of the Site A transcripts as well as the Site B transcripts was useful for refining the codebook. The test-retest reliability for the final codebook showed high rates of reliability.

The entirety of the internet transcripts was not coded. The first round of coding identified moderator statements and statements made by the Site A and Site B participants. Only these statements were further coded but the analysis focuses on the context of the statements and how they related to those of other participants.

The availability of transcripts of deliberation as well as of survey data provides me with both unstructured and structured data allowing for both data that can be easily categorized and measured as well as data that is context-dependent (Krippendorff, 2004). Statistical analysis of the coding categories is used to compare the results from the two cases. In addition, a more grounded reading of the transcripts helped to understand the experience of the participants. Only recently have scholars started arguing for using more qualitative, discursive methods to understand the participants' experience of deliberation as well as the discourse during deliberations (Gorsdorf, 2006; Harvey, 2009; Powell et al.,2011).

3.8.2 Survey Analysis

The analysis of the survey data using quantitative techniques provide additional insight into the process as well as allows me to compare the survey data with the interview data in the case of a few of the participants. The participants' demographic characteristics were collected from the survey data. The survey also provides information of achieved characteristics' such as income and education; their motivation to participate and their knowledge of the subject and their satisfaction with the consensus reflected in the final report. The availability of both survey data as well as interview data provided for a better insight into the participants' perceptions of the exercise and for richer and greater detail.

3.8.3 Analysis of Interview data

The analysis of the facilitator interview transcripts was based on understanding how the facilitators perceived their role, their sensitivity to status and power differences among the participants, and their manner of mitigating these differences to make the process an inclusive one. The analysis of the participants' interviews focused on identifying the participants' perceptions of other participants, the facilitation, and whether they felt included in the process.

3.8.4 Analysis of Final reports

The final reports were coded for concerns using the words of the report. The analysis linked these with the concerns that were identified in the transcripts.

3.9 Advantages and Limitations of the Data and Methodology

Since the subject of research is inclusion within a deliberative process, the main advantage of the data is the availability of the actual talk rather than just participants and facilitators recollections of the process. In addition, the availability of both audio and video recordings was advantageous as at times transcripts can be "rather flat reproductions of interactions" (Rapley, 2007, p. 58). The video recordings helped provide visual clues to the interaction though I have not used them in my analysis. But as I discuss later in Chapter 5, the video recordings helped to understand the nature of the interruptions. The availability of survey data, interview data from facilitators and participants, along with the transcripts was helpful in triangulation and contributes to the reliability of the conclusions. The limitations of the interview data with regard to the long interval between the process and the interview have been listed earlier.

CHAPTER 4

INCLUSION AS MEASURED BY PRESENCE

Any participatory process needs to be open and inclusive in order to be legitimate. Diversity of participants is also important so that there are differing viewpoints that participants can engage with, disagree with, empathize with and then reach a satisfactory solution. In this chapter, I answer the question "who participated". An inclusive process is one that is accessible and open to all and is characterized by the presence of a diversity of participants. I touch upon the question of presence and representation that has been central to discussions on participatory democracy. Using data from the survey as well as the transcripts, I look at how diverse the NCTF was in terms of its participants.

4.1 Presence and Representation

Obtaining a diverse group of participants is the first step in generating an inclusive participatory forum. The ideal of deliberation as reasoned argumentation between equals who put aside their particular interests to think of the common good underpins organizers' notions of who the participants should be. This ideal also acts as an exclusionary criterion; special interests, for instance, are excluded from many public participatory processes as they jeopardize the notion of common good.

The issue of "representation" is central to designing any participatory process and more so in forums such as citizens juries and consensus conferences where the number of participants is extremely small. The notion of representation is anathema to deliberative theory for it creates a passive citizenry due to its principal-agent character. The participants are not a statistical sample

whose views reflect those of the larger public from where they are drawn. Instead, the goal of recruitment is that the group of participants will represent the diversity of the larger community that they are drawn from; termed as the microcosm model by Smith and Wales (2000) and as descriptive representation (Parkinson, 2004). For the difference theorists, participation is based on the concept of presence; the representation of marginalized groups requires their actual presence within the participative forum or else their perspectives are not considered or are dwarfed by the concerns and perspectives of the majority (Phillips, 1994). Descriptive representation does not, however, imply strict proportionality since the minority participants would again be overshadowed by the majority (Parkinson, 2004). Smith and Wales (2000, p.56) point out certain problems with the microcosm model of representation- a small forum such as a consensus conference or a citizen jury may not be able to contain all the viewpoints present in the larger community; it can create "false essentialisms" as in individual participants being expected to represent their larger group; and it may assume that a participant cannot represent the interests of those who have different characteristics. Organizers should be clear about whether participants are chosen as representatives of their larger group or as "citizens who, while reflection on their own values and experiences, are also open to the possibility of transformation in light of their reflection and deliberations with other participants" (p. 57). However, as pointed out by Parkinson (2004), most of these problems arise if the two distinct concepts of representative and representation are mixed up. If the goal of the participatory exercise is to formulate a set of recommendations and not come to a binding decision then descriptive representation is legitimate. And the problem of "false essentials" and proportionality can be solved by applying a threshold level for all groups.

Within the S&T policy domain, the 'deliberative turn' has focused on incorporating the viewpoints of the ordinary/ non-expert/lay citizen. Organizers of the deliberative processes seek to recruit the "non-expert" or the citizen who lacks specialized knowledge about the topic or area. Each participant is not representative of a group but is present to voice his or her particular experience and viewpoint providing a "qualitatively different voice" to the process of technology assessment (Hamlett, 2003). Braun and Schultz (2009) present a typology of the ways in which the public is constructed within participatory processes. They argue, in the social constructivism tradition, that a process of naming and selection creates the public. Their typology contains four constructions of the public- the general public, the pure public, the affected public, and the partisan public. The general public is constructed through public opinion polls. The pure public, constructed through consensus conferences and citizen juries, is conceptualized as citizens or laypeople, as individuals rather than members of interest groups. "In addition, their main qualification is exactly their ignorance concerning the issue at stake and, at the same time, their amenability to education" (p. 409). The "affected public" is seen as possessing expertise arising from their particular experience. Finally, the partisan public is made up of organizations, and not individuals, that have particular interests.

Many studies of participatory processes have looked at the diversity of participants by focusing on their individual characteristics and motivations to participate. Barnes et al. (2003) argue that the power relations around and within a forum is an important consideration, that is, the manner in which "the public" is defined by organizers shapes who participates. Following a social constructive approach, they view "the public" or "the citizens" as constructions that arise from institutionally embedded discourses that determine access as well as the legitimacy of who can participate. In addition to such discursive practices, the other factors that can determine who

participates are competence (a particular knowledge or experience), skills (specialist versus experiential knowledge), and the practices of participation.

4.2 Rules of Engagement

The rules of engagement (Barnes, 2002) or the rules formulated by the organizers are an important determinant of who the participants; they act not only to identify the legitimate participants but can also frame the nature of the dialogue between them.

The NCTF participants were recruited on the basis of responses to newspaper advertisements that were placed in the lead local newspaper of each site. The response rate varied across sites. From the larger group of respondents a group was selected that was diverse and reflected the demographic diversity of the area. The recruitment was largely centralized; at Site A, the local organizers had to press for the newspaper advertisement to also be placed in the historical black newspapers in addition to the main local newspaper so as to reach the African-American community. At Site B too, the local organizer was of the opinion that their group composition could have been more representative if the recruitment had been left to the local organizers.

The newspaper advertisement described the NCTF as a university research project on nanotechnology. The respondents to the advertisement were administered a survey to gather their demographic information. Three of the questions on the pre-applicant survey, if answered yes, precluded their participation. These were- “are you, or have you recently been, employed in nanotechnology, biotechnology, information science, or cognitive science”; “are you directly financially invested in any nanotechnology, biotechnology, information technology, or cognitive science business (not including mutual funds)”; and “are you, or have you recently been, active

in a citizen group that has taken a public position concerning human enhancement technologies". In addition, since part of the deliberations was conducted over the internet, a home computer with internet access was a pre-requisite to participation. However, there was one participant at each site that answered yes to the question regarding employment by a business in an NBIC field.

Since one of the goals of the project was "demonstrate that *average, non-expert citizens* can understand even quite complex issues and, if they have adequate information, they can come to sensible, informed judgments about those issues" (italics mine);[13] employment or financial investment in NBIC was an indicator of expertise and of a stake or interest respectively. In addition, those who were members of advocacy groups would have strong opinions that could distort the deliberations causing undesirable polarization effects. Most citizen deliberative exercises aim at recruiting "ordinary" or "lay" citizens. Often the lay participant is viewed as a non-expert, as someone who has neither a vested interest nor specialized knowledge of the topic. In other words, a lay participant does not have a specific position or bias that can distort the deliberative process. Underlying this conception is the belief that an unbiased, neutral participant will engage in a more open and reasoned manner and will consider the common good over his or her particular interest.

4.3 Motivation to Participate

The motivation to participate can have an effect on the manner in which the participants engage with the process. Analysis of the survey data and the interviews reveal that the participants had different motivations to participate. However, the stipend amount of $500 was important for many participants. In response to the survey question, "thinking of the reasons why

[13] http://www4.ncsu.edu/~pwhmds/

you volunteered, would you have agreed to participate without being offered money as compensation for your time", 56 % of the Site B participants answered that it was either somewhat unlikely or very unlikely that they would have participated; while, the figure was 38.46% in the case of the Site A participants.

Table 2: Motivation to participate

Reason	Site A				Site B			
	No of Participants	Mean	Median	SD	No of Participants	Mean	Median	SD
Learning about Nanotechnology and human enhancement	13	9.8	10	1.4	9	8.2	8	2.1
Desire to be politically engaged	13	8.1	9	2.3	9	8.4	9	2.6
Financial compensation	13	7.5	7	2.7	9	8.1	9	3.4
Desire to take part in current research	13	9.4	10	1.7	9	8.9	9	1.7
To socialize and meet people	13	5.6	6	3.1	9	4.9	4	3.1

SD= Standard Deviation
Note: responses were on an11 point scale ranging from very unimportant to very important
Source: Survey data

For the participants at Site A, the two most important reasons to participate in the NCTF were- learning about nanotechnology and to take part in current research. In Site B, three reasons for participation were ranked equally high-the desire to be politically engaged, financial compensation, and desire to take part in current research. The transcripts also provide information on participants' motivation to participate in the NCTF. During the introductory session on the first day of the face to face deliberation, the facilitators at both sites asked the participants the reason for their participation. At Site B, three of the participants mentioned the financial compensation as motivation; four mentioned finding the topic fascinating with its

elements of science fiction and characterized by immense potential as well as by uncertainties; for another participant her motivation to participate was on account of a body implant that could be categorized as an enhancement device. In Site A, four of the participants mentioned the financial compensation but only two of them identified it as the primary motivation; eight mentioned the topic as well as learning more about the technology as motivation; for two of the participants the topic was close to their research interests (one was a graduate student while the other was a research chemist); and one participant said the opportunity to participate in policy-making was important.

The interviews with the participants also provide an insight into their motivation to participate.

1. Participant 1 (Site A) said that part of the motivation was the stipend amount and the fact "*that it was a research endeavor and my participation would help soc*iety".
2. Participant 2 (Site A) stated that there were many reasons for his motivation to participate including his research background, interest in scientific advance and "*interest in science being held to the proper ethical standards*". A secondary motivation was "*to get a feel of how other members of the general population felt about nanotechnology and its applications*".
3. Participant 3 (Site A) the motivation was her interest in technology and "*a desire to know the latest trends in technological innovations*." Also, the "*whole openness of the ad was intriguing and I felt that I would get to interact with a cross section of society, with people who are not in the field, with people who know what the ongoing things are*". The fact that it was organized at the research university also meant that it would be an "*exciting project*".

4. Participant 4 (Site B) said that her biggest motivation was the fact that she is "*a recipient of technology for human enhancement and I am very anxious to see that kind of technology advance with the greatest speed possible with the least risk to people*."
5. For Participant 5 (Site A) the primary motivation was to know more about the subject of nanotechnology and "*I thought it would be fun to get it from a layman's perspective*".
6. For Participant 6 (Site B) the motivation was primarily the compensation as at that moment in time he needed some extra income; his secondary motivation was the topic.

Two of those interviewed do not fall into the categories of the "disinterested" and the "non-expert" citizen. Participant 4 was very clearly had a strong position with regard to the technology and was pro-enhancement technologies. This was a view that she held consistently through the deliberations. Participant 2 due to his background as a research chemist had specialized knowledge about the topic and the field of nanotechnology. I will expand on this aspect in the next chapter.

4.4 Demographic Diversity

In addition to being non-experts, the groups of participants were to reflect the demographic diversity of the area. **Table 3** provides the demographic information for the participants at Site A and Site B.

Table 3: Demographic characteristics

	Site A	**Site B**
No. Of Participants	13	9
Gender		
Male	54%	33%
Female	46%	67%
Median Age	45	41
Education		
High School		
Some College	38%	33%
College Degree	31%	56%
Grad School	31%	11%
Race		
White	46%	45%
Black/African-American	38%	33%
Asian-American	8%	22%
Native American		
Hispanic	8%	
Other		
Income		
<$15K	8%	
>$15K <$$35K	15%	22%
>$35K <$50K	8%	33%
>$50K <$75K	38%	11%
>$75K <$100K	15%	11%
>$100K	15%	22%

Source: Survey data

As seen in **Table 3**, the group of participants at Site A was more evenly dispersed across the categories of gender, race, education and income. The Site B group, in contrast, deviated from the mean group of participants across all six NCTF sites. In terms of the presence of members of less powerful groups, women formed a majority in the Site B group while minorities had a larger presence in Site A forming a slight numerical majority as compared with Site B. In terms of income, those earning less than $50K a year were a larger proportion of the group in Site B but the percentage of participants earning less than $35K a year was nearly the same in both groups. However, keeping in mind that status is a fluid and context-dependent concept, the

data shows that the less powerful in one dimension where not necessarily so in the other. For instance, at Site A, 57% of the African-American participants had an income higher than $50K per year and 60% of the African-Americans had a college or graduate degree while the rest had some years of college.

4.5 Diversity in Viewpoints

With regard to ideology, knowledge of the subject as well as trust in government and sciences, the two groups also differed (**Table 4**). The Site B group of participants was overwhelmingly liberal, mostly Democrats and the majority knew nothing or just a little about nanotechnology. Republicans and conservatives were absent from the group. Again, in comparison with the Site B participants the Site A group of participants was more evenly distributed across the party affiliation, ideology and knowledge categories.

Table 4: Ideology, Knowledge and Trust

	Site A	Site B
Party Affiliation		
Democrat	54%	78%
Republican	8%	
Independent	15%	11%
Other	23%	11%
Political Ideology		
Liberal	31%	56%
Moderate	54%	33%
Conservative	8%	
Other	8%	17%
Knowledge of Nanotechnology		
Nothing	15%	33%
A Little	38%	33%
Some	46%	33%
A lot		
Confidence in government to protect public from Nanotechnology risks		
Disagree/ Strongly Disagree	31%	22%
Agree/Strongly Agree	54%	33%
No Opinion	15%	44%

Number of participants in Site A: 13 Number of participants in Site B: 9
Source: Survey data

4.6 Initial Concerns

During the first day of the first face to face interaction, the participants voiced their initial reactions and concerns with regard to the use of NBIC technologies for human enhancement. These were used as building blocks by the facilitators to move the discussion along. The initial concerns also provide an indicator of the diversity in viewpoints that existed within each group of participants. The analysis of the transcripts reveals that in Site B, regulation of technology emerged as a major concern. Five of the participants talked about safeguards and checks and balances. However, there were different aspects of this broad category of concerns, such as, corporate control of the technology, lack of faith in the FDA to regulate human enhancement technology, regulation of products already on the market, which bothered different participants.

One of the participants was a proponent of limited regulation who believed that too much regulation can stifle innovation. The participant who argued for focusing on everyday applications was also someone who took up a major part of speaking time and had more 'deliberative capital' than many of the other participants. I will also discuss this in the next chapter but the participant's determination to focus on products using nanotechnology materials that were already on the market or close to it rather than on "*more far out space-human, whatever, human computer interactions*", lead to the policy recommendations of the Site B group to have a more downstream focus. "*So I guess I want to make sure we do not overlook that in our conversation here because those things are probably more like about to hit the market sooner but probably just speaking as dangerous*".

In addition, one of the participants was a strong pro-human enhancement technology advocate. While other participants displayed a more ambivalent stance towards the technology, this participant believed that the benefits of technology were "*very exciting*" and there existed a lot of "*fear mongering about the technology*". However, she also did not have faith in the regulatory agencies to regulate these technologies and "(…) *that is part of the reason too that I am here is to hopefully the support will influence regulatory agencies to get up to task to regulate these technologies*".

In Site A, during the introductory session the participants did not display a strong pro- or anti- human enhancement technology position. Their views did display enthusiasm for the remediation applications of NBIC technologies and a cautionary approach towards the enhancement applications. The Site A participants also made more references to the scenarios contained in the background materials (see Chapter 3). The bar less prison was a scenario that they found particularly disturbing. In addition, the reference in the background materials to the

development of a 24/7 soldier was for one of the participants an application that carried undertones of the Nazi attempts to engineer a master race. Two of the participants expressed concern regarding the regulation of these technologies; another was concerned about our dependence on technology; three participants had concerns about choice in the adoption of the technology, cost and affordability, and access to these technologies; and two of the participants raised the ethical issues involved in these technologies- how far do we go and the issue of 'playing God'.

At both Site A and Site B, the group of participants had differing viewpoints regarding the technology and a variety of concerns about NBIC technologies for human enhancement. Their diverse experiences, occupations and backgrounds also provided a variety of perspectives on technology, its role in society, and its development. These were not a group of neutral, average citizens, however. Strong viewpoints and interests and specialized knowledge were present within the groups shaping the deliberations.

4.7 Conclusions

The issue of representativeness has been discussed frequently in the literature pertaining to public participation in general. The recruitment strategy was largely successful in assembling a group of participants at the two sites that were indicative of the demographic diversity of the geographical area from which they were drawn. The literature has also stressed the need to have a varied group of participants so that a diversity of issues, concerns and viewpoints can be discussed, mulled and reflected upon. The two groups of participants were diverse in terms of their occupation, age, gender, education, and income. They also differed in terms of their perspectives on the technology. The recruitment strategy did exclude those who did not have

access to an internet connection. But it was not effective in screening out all the participants who had a professional stake or interest in the technology or those who had a personal stake in the development of the technology as reflected in a strong pro-enhancement viewpoint. The presence of these individuals had an impact on the deliberations as detailed in later chapters.

CHAPTER FIVE

INCLUSION MEASURED BY VOICE

In this chapter, I start by describing the tasks and activities that made up the face to face sessions. The ground rules pertaining to deliberation at both sites are also described. The main part of the chapter deals with the relationship of status, facilitation and expertise with equality of speaking time. The chapter ends with conclusions regarding the hypotheses about voice of the participants.

5.1 Tasks and Activities

I will start by describing the tasks and activities that made up the face to face sessions. As mentioned in Chapter 4, the structure and broad format was the same across the six NCTF sites but the local organizers and facilitators had leeway to organize these tasks in their own way. A major difference between the Site A and Site B NCTF groups that affected the structure of tasks was their size. During the organizing stage of the project, the organizers at Site B had drafted and circulated to all the local and main organizers a draft facilitation plan for the face to face deliberation sessions. This formed the basis of the format at both Site A and Site B. The objectives of the first face to face weekend were- "Communicate project objectives and process, establish agreed ground rules, develop and prioritize list of concerns/excitements/questions; clear understanding of process for second weekend". The first day opened with a presentation by the organizers/facilitators about the NCTF project-its context, scope and sponsorship. The format, group process and methodology were explained and the role of consensus highlighted. The facilitators then presented the ground rules and took comments on them. At Site B, the facilitators also asked the participants for any additional rules. In the second session on the first

day, the facilitator asked the participants for their initial reactions to the material in the background readings, their area of excitement and concerns as well as any questions they had. In the next two sessions, each participant wrote their specific concerns, questions and excitements on oversized post-its which were placed on three flip charts titled concerns, questions and excitements. In Site A, the larger group was broken into smaller groups for group discussion but each participant wrote out their own concerns, questions, and excitements. At both the sites, the facilitators organized these different post-its into categories of excitements, concerns and questions by asking the participants to reorganize, refine and combine them. Each session was lead by one facilitator while the other recorded and wrote up the discussion. The Site B facilitators also set aside the last hour or so of the first day to answer any "factual" questions that the participants had.

The next day started with a review of the categories of concerns to ascertain why these areas were a matter of concern to the participants. In light of the discussion, these categories were modified to further refine them. This was followed by a discussion to identify the values that underpinned these concerns. Each session started with brainstorming and then combining and categorization and further refinement followed by a prioritization of the concerns based on the discussion. The draft facilitation plan suggested using a multiple voting method to prioritize the concerns and questions. Multi-voting or Negotiated Group Task (NGT) is a tool used in group facilitation to narrow down a large group of concerns into a smaller list. It allows those concerns that are common to all to make it to the final group but not necessarily everyone's top concern. While the facilitators at Site B used this method, the facilitators in Site A used a system of majority votes. However, facilitators at both sites asked participants to include any other concern that had not made it to the final list. The questions and excitements were also prioritized

using the same method. In the final session of the second day, facilitators talked about the upcoming internet sessions and formulated a set of questions for experts that was sent to the main organizers at North Carolina State University. Some of these questions were then sent to the experts and their replies were posted on the website ahead of the internet sessions.

Though the participants had a number of questions regarding the internet sessions and about the experts participating in these sessions, the facilitators could only provide limited information. The lack of coordination between the central organizers and the local ones was stated an area of improvement by one of Site B facilitators. This frustration was expressed in terms of "we-versus-them". This aspect of the design was also a source of alienation for the local facilitators. The lack of role in the internet session or any attempt to seek the feedback of the local facilitators on the internet was a concern for one of the Site A facilitators. The specific instance mentioned in the interview was the initial internet sessions when the participant was viewed as a representative of the group. The moderators asked each participant who was "chat active" to list the areas of concern in their local group. At times, the individual concern of the participant was stated as a group concern; feedback from local facilitators would have provided valuable perspective.

The objective of the second and final weekend of face to face deliberation was to produce the final report containing a set of recommendations. On the first day of the second face to face weekend, the facilitators started by asking the participants their reactions to the internet sessions- their likes and dislikes, and what they learned. This was followed by constructing a framework for the report based on their prioritization of concerns and excitement as well as the internet discussions. The next few sessions focused on formulating recommendations based on the priorities and the final session were spent writing the report. Again, in Site A there were

smaller group sessions to discuss the concerns and frame recommendations which were then discussed by the larger group.

The draft facilitation plan also suggested using the scenarios in the background materials as "probes' to identify the values and reasons underlying participants' concerns.

5.2 Equality of Speaking Time

The amount each participant speaks is seen as an indicator of equality. Providing participants with equal opportunities to speak is an important consideration also for inclusivity. As Sanders (1997) has stated, the influence a participant exerts is not based on presence but on the amount he or she contributes to the discussion, "real deliberation is likely to under represent exactly those who need representation the most. (…) Even if these people show up, they are likely to be seen as the least persuasive, to be discounted more frequently" (p. 349). The variations in individual contributions have been explained by both individual and social factors such as knowledge, education, gender, and race (McLeod et al., 1996; Hans and Vidmaar, 1986). One of the detailed analysis of equality in deliberation focuses on political deliberation. Dutwin (2003) in his analysis of political deliberation has looked at three variables that capture equality-amount of speaking, number of topics addressed by each participant, and the ratio of argumentative elements provided by each participant. His analysis reveals that there is equality in deliberation; prior political conversation is a significant variable in deliberating politics while political sophistication as measured by education, political interest and knowledge is not. In the area of health care, Davies et al.'s (2006) detailed ethnographic study of deliberative participation also looked at the size of participants' contributions focusing on three categories-gender, minority groups, and those who were visually impaired.

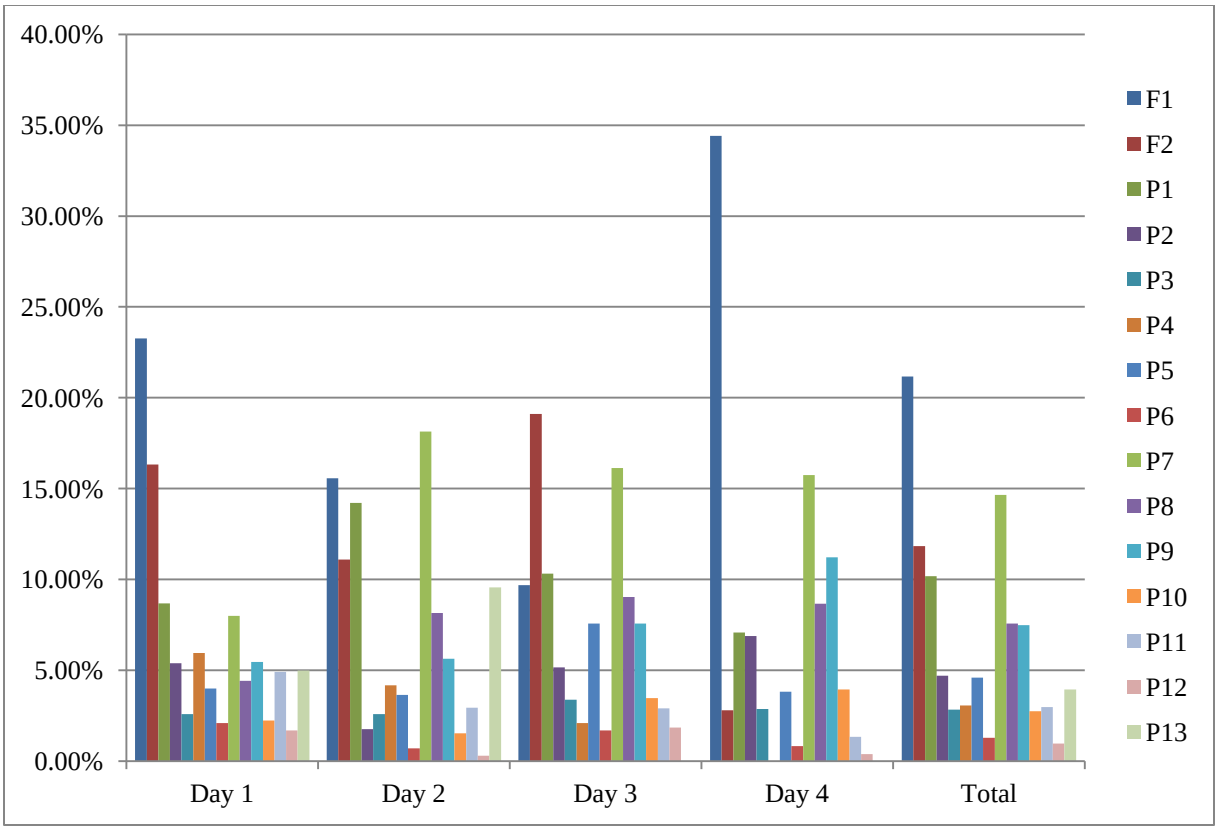
Equality of speaking time is an indicator of dominance in deliberation by some participants. The emphasis on equality of speaking time is not an argument for all participants to speak equally or for a particular threshold of speaking time that is to be considered desirable for inclusive deliberation. Equality of speaking time also does not denote equality in contribution to the deliberations. My focus on equality of speaking time is to understand whether there were participants who dominated and those who spoke barely. Their differing contributions, despite the rules of engagement that level the differences between participants, provide information on whether certain participants dominated the deliberations at the expense of others. "Equal participation requires that no one person or advantaged group completely dominate the reason-giving process, even if the deliberators are not strictly equal in power and prestige" (Thompson, 2008, p. 507). Equality in speaking time also is linked to the probability that a diversity of viewpoints will be expressed and heard (Burkhalter et al., 2002).

In line with Stromer-Galley's (2007) measure of equality (frequency and volume of participation), I look at equality of speaking time using two variables- lines of text and number of utterances. Each line of text in the transcript was coded as one; each incomplete line was coded as one if it was more than half a line and zero if less than half a line. The number of utterances measured each time a participant spoke. However, responses of yes, no, okay that were not followed by any other statement were not counted. These were also not counted in the lines of text. In addition, lines of text were counted separately for the four days of face to face deliberation and then aggregated. As described earlier in the chapter, the activities and tasks varied over the four days accounting for a significant variation in participants' contributions. Finally, both Site A and Site B had one less participant on the final weekend of the face to face

deliberations and one of the participants in Site A could not make it to the last day due to a family emergency. Therefore the number of participants varies over the four days.

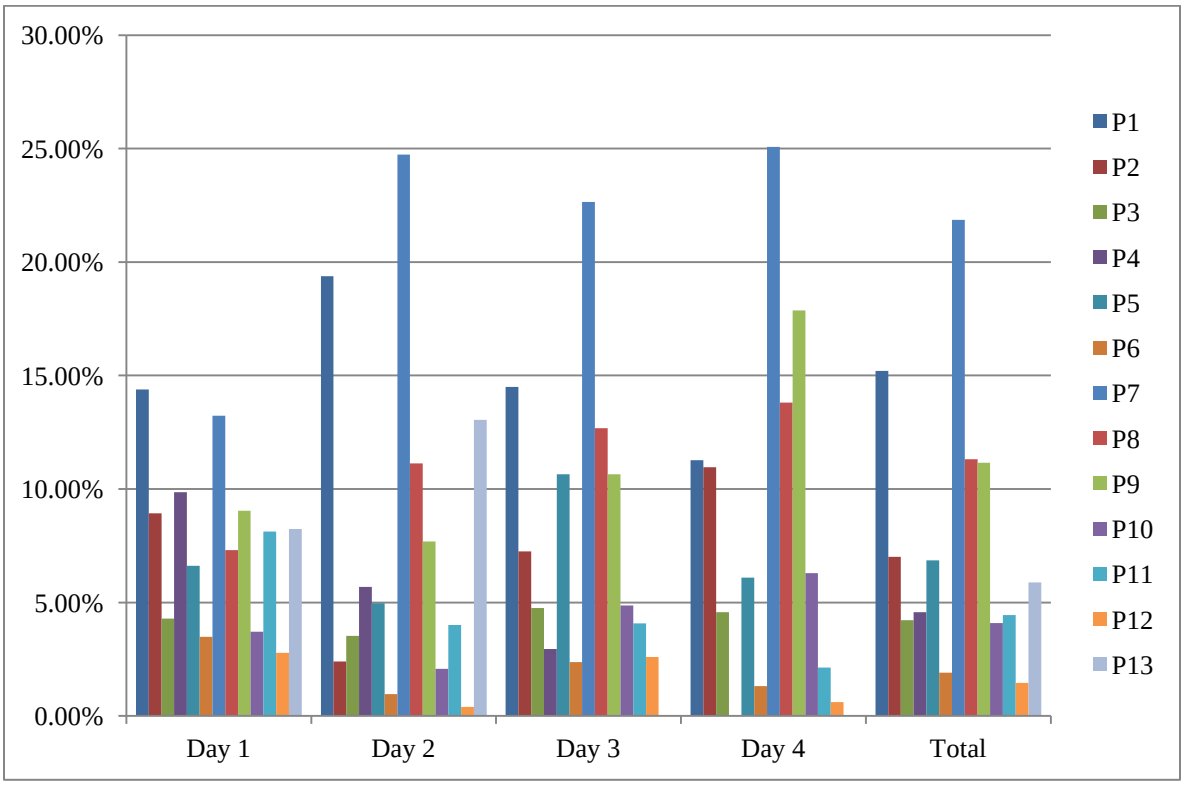
5.2.1 Site A NCTF

Figure1 displays the data for the percentage of lines of text attributed to the participants as well as the facilitators. It has to be kept in mind that facilitators do take up a lot of the total speaking time within a deliberative process introducing and explaining the process, summarizing the discussion as well as answering questions. However, this is also dependent on the speaking style of each facilitator. **Figure 2** displays the data with reference to only the participants. **Figures 3 and 4** show the data with regard to the number of utterances.



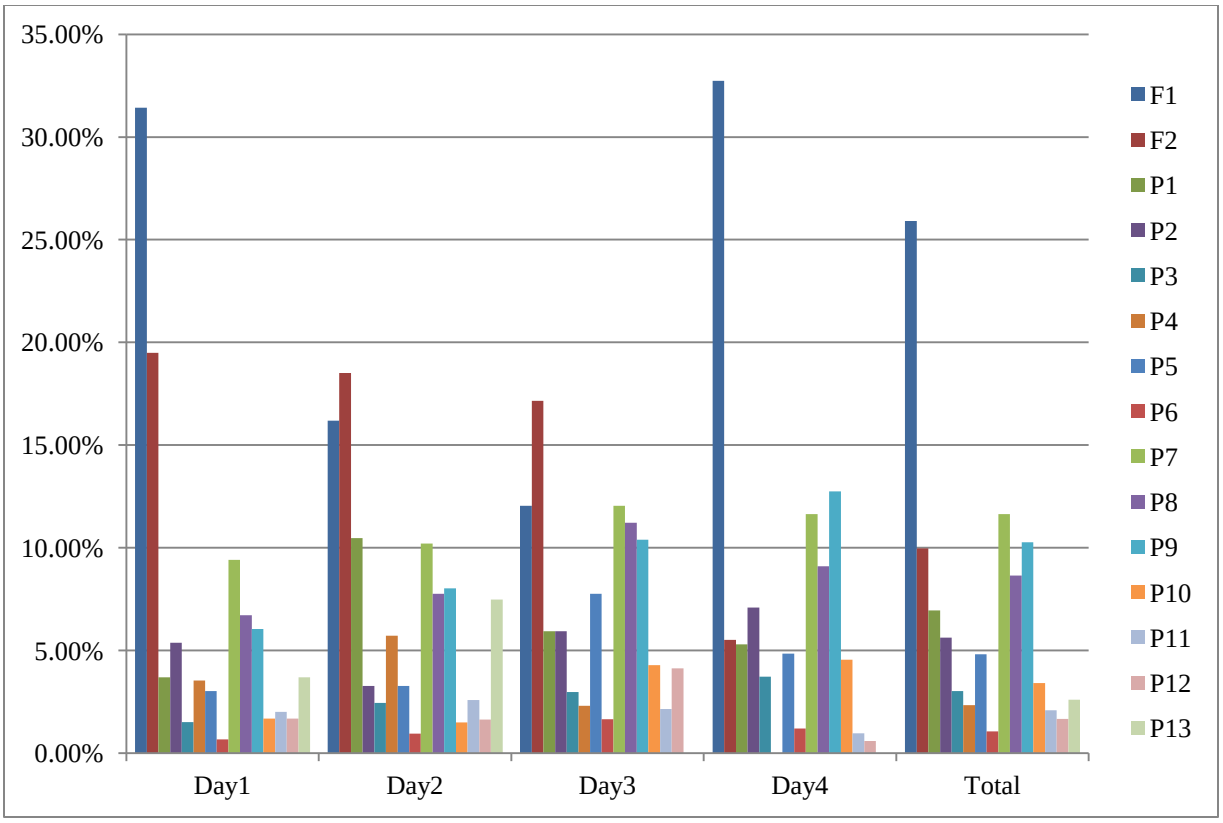
F: Facilitator P: Participant
Number of participants on day 1: 13
Number of participants on day 2:13
Number of participants on day 3:12
Number of participants on day 4:11
Source: Transcripts of the deliberations

Figure 1: Individual contributions of participants and facilitators as a percentage of total speaking time in Site A



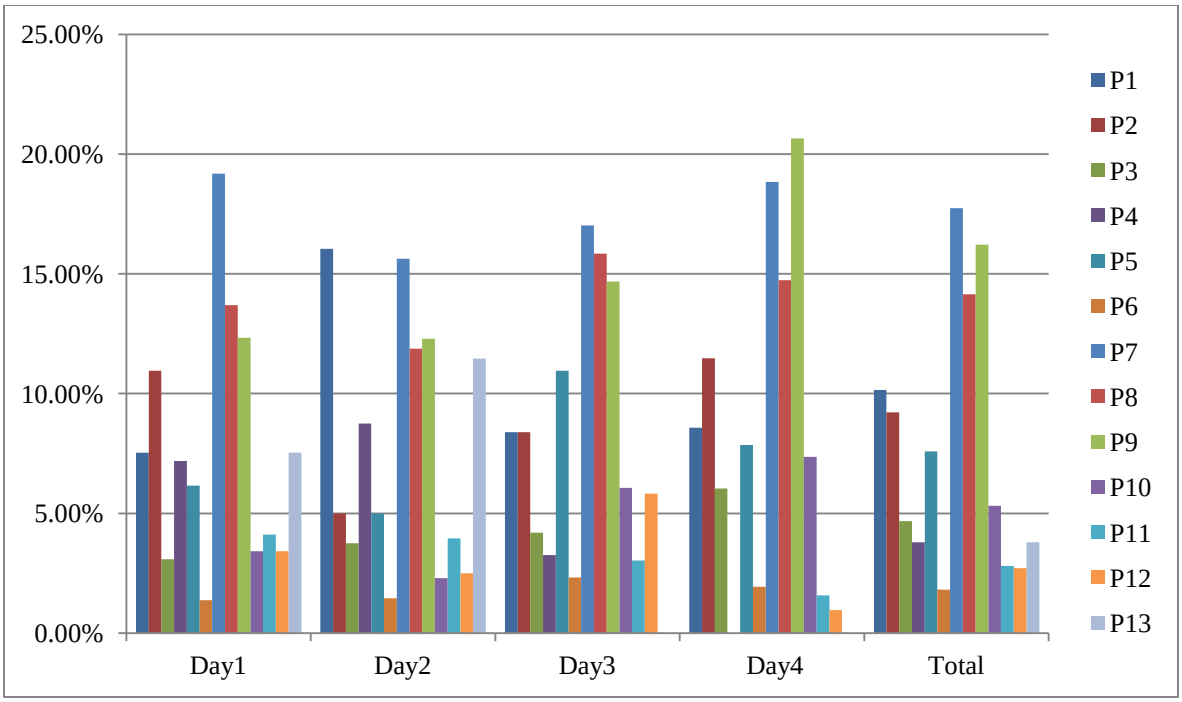
P: Participant
Number of participants on day 1:13
Number of participants on day 2:13
Number of participants on day 3:12
Number of participants on day 4:11
Source: Transcripts of the deliberations

Figure 2: Individual contributions of participants as a percentage of total participant speaking time in Site A



F: Facilitator P: Participant
Number of participants on day 1: 13
Number of participants on day 2:13
Number of participants on day 3:12
Number of participants on day 4:11
Source: Transcripts of the deliberations

Figure 3: Total number of utterances by participants and facilitators as a percentage of total utterances in Site A



F: Facilitator P: Participant
Number of participants on day 1: 13
Number of participants on day 2:13
Number of participants on day 3:12
Number of participants on day 4:11
Source: Transcripts of the deliberations

Figure 4: Total number of utterances by participants as a percentage of total participant utterances in Site A

In a facilitated process, it is the responsibility of the facilitators to ensure that no particular participant dominates the proceedings and that each participant contributes to the deliberations. But the concept of equality of speaking time also has drawbacks. Each participant's contribution need not be directly correlated to the amount he or she speaks for what is spoken is also important. It is clear from the figures above that there were clearly some participants who spoke a lot and some who barely contributed to the discussions.

In Site A, 35.88% of the total speaking time can be accounted for by the two facilitators. Out of the total participant speaking time; three participants contribute to 48.10% of the speaking time while the three participants who spoke the least account for only 7.34% of the time. The

average speaking time per person was 7.69%. The small group sessions were not recorded; hence, they are not part of the transcription. Also, when the whole group reconvened after the small group sessions, one member of each group spoke about the group's concerns or recommendation. I have included this as part of the speaker's statements as this was a role that the group allowed him or her to assume.

Table 5: Speaking time by gender, race/ethnicity, income and education in Site A

	Day1 Average	Day 2 Average	Day 3 Average	Day 4 Average	Total Average
Number of utterances	**%**	**%**	**%**	**%**	**%**
Gender					
Men	9.10	8.57	10.41	10.69	8.96
Women	6.05	6.67	6.25	7.17	6.21
Race					
White	10.39	10.42	11.10	10.92	9.63
Black	4.45	4.29	5.13	4.68	4.27
Asian	3.08	3.75	4.20	6.04	4.68
Hispanic	12.33	12.29	14.69	20.65	16.21
Income					
Less than median	9.50	7.66	9.62	8.51	8.69
More than median	6.89	7.71	6.84	7.33	7.25
Education					
Some college	7.19	10.31	8.47	10.39	9.40
College degree	3.88	6.51	8.29	7.65	6.80
Number of Lines					
Gender					
Men	7.49	9.01	9.59	10.96	8.60
Women	7.93	6.15	7.08	6.84	6.63
Race/ethnicity					
White	9.15	11.85	11.94	12.35	10.45
Black	6.36	3.54	4.98	3.96	4.38
Asian	4.29	3.52	4.76	4.57	4.22
Hispanic	9.05	7.69	10.65	17.87	11.16
Income					
Less than median	8.18	6.04	8.38	10.29	7.44
More than median	7.48	8.42	8.31	8.64	7.80
Education					
Some college	8.79	10.27	9.17	10.51	9.42
College degree	7.21	6.55	8.05	7.73	7.17

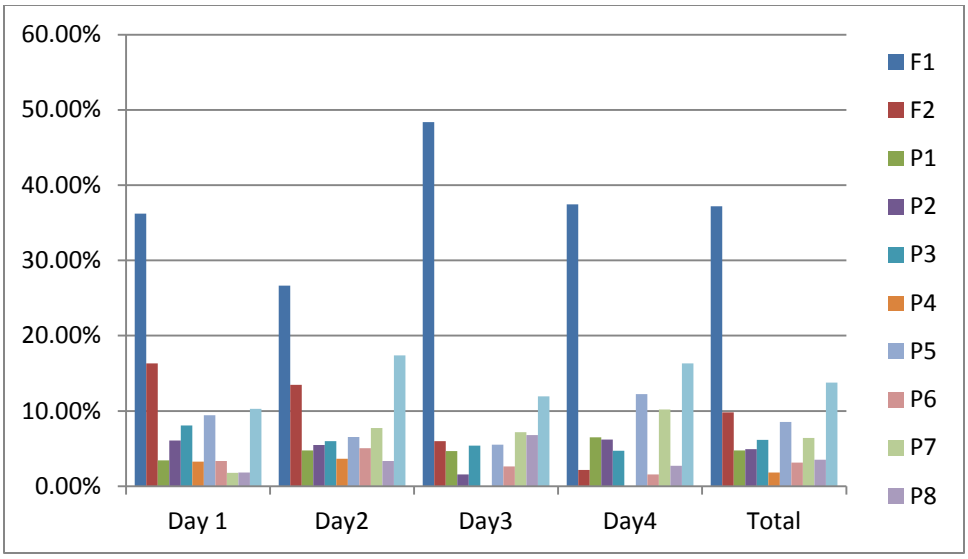
Source: Transcripts of the deliberations

The table above shows the variations in speaking time for the more powerful and the less powerful groups over the four days as well as the averages. Looking at the number of lines of

text, with regard to gender, men on an average spoke more than women. All three participants who spoke the most were men. There is parity between the two groups during the first day. This can be accounted for by the fact that the facilitators went round the table and called on everyone to introduce themselves and elicited everyone's views regarding their initial reactions to the background materials and to the technology, as well as their concerns, "excitements", and questions. Looking at the racial categories, there was only one Hispanic participant in the group who also had the second highest speaking time. This is a case of status incongruence, as in addition to his minority status, he was male, higher income, a college student who also worked at a non-profit. The white participants did take up much more speaking time than the black and Asian participants. In fact, four of top five speakers were white. There was no major difference in speaking time with regard to income.

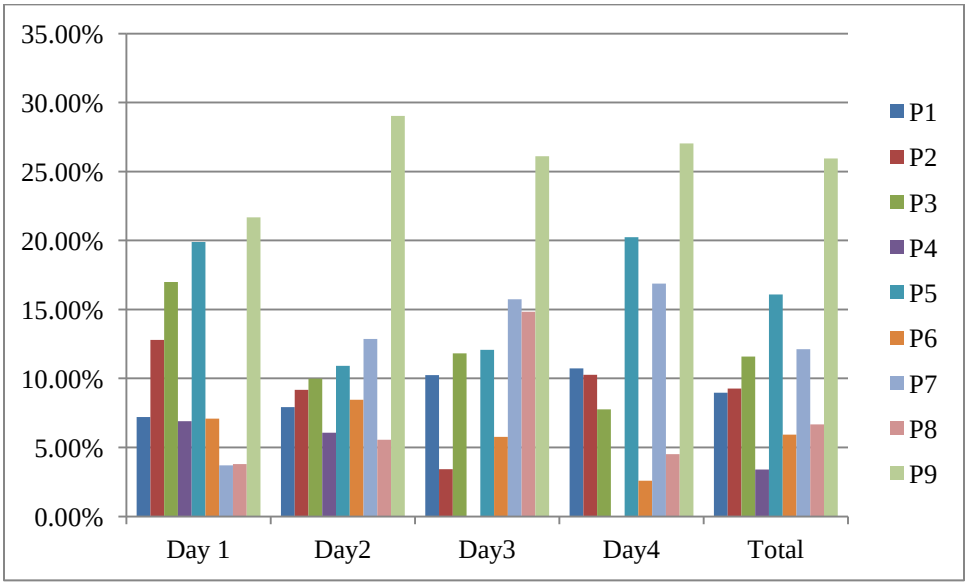
5.2.2 Site B NCTF

The **figures 5-8** depict the data pertaining to the participants' and facilitators share of the total speaking time in Site B.



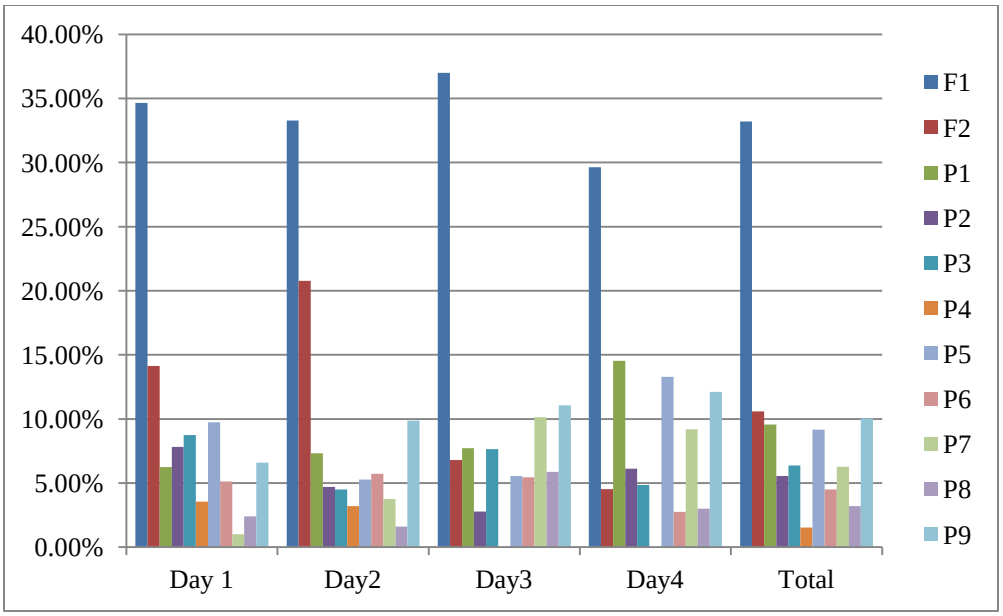
F: Facilitator P: Participant
Number of participants on day 1&2: 9
Number of participants on day 3&4:8
Source: Transcripts of the deliberations

Figure 5: Individual contributions of participants and facilitators as a percentage of total speaking time in Site B



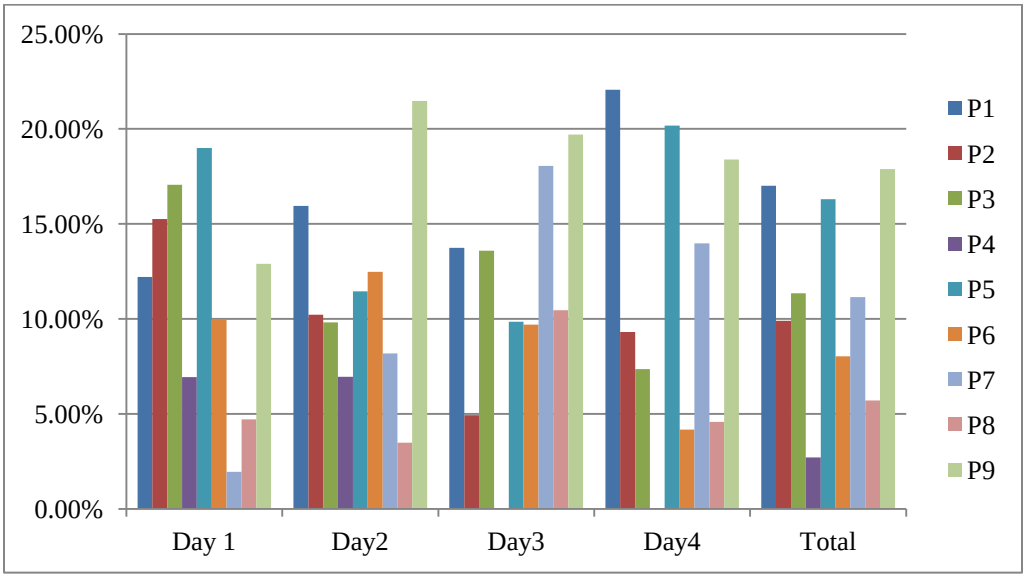
Facilitator P: Participant
Number of participants on day 1&2: 9
Number of participants on day 3&4:8
Source: Transcripts of the deliberations

Figure 6: Individual contributions of participants as a percentage of total participant speaking time in Site B



Facilitator P: Participant
Number of participants on day 1&2: 9
Number of participants on day 3&4:8
Source: Transcripts of the deliberations

Figure 7: Total number of utterances by participants and facilitators as a percentage of total utterances in Site B



F: Facilitator P: Participant
Number of participants on day 1&2: 9
Number of participants on day 3&4:8
Source: Transcripts of the deliberations

Figure 8: Total number of utterances by participants as a percentage of total participant utterances in Site B

In Site B, 46.99% of the total speaking time can be accounted for by the two facilitators. Out of the total participant speaking time; two of the participants contributed 42.04% of the speaking time with the top speaker taking up 25.95% of the total participant speaking time. While the three participants who spoke the least account for only 15.99% of the time; this figure includes the participant who was present only for the first weekend deliberations. The two participants who spoke the least and were present on both the face to face weekends account for 12.60% of the time. The average speaking time for each participant was 11.11%.

Table 6: Speaking time by gender, race/ethnicity, income and education in Site B

	Day1 Average	Day 2 Average	Day 3 Average	Day 4 Average	Total Average
Number of utterances	%	%	%	%	%
Gender					
Men	9.80	11.45	12.24	15.11	12.68
Women	11.77	10.94	12.66	10.93	10.33
Race					
White	13.35	11.15	9.50	17.18	11.48
Black	9.66	10.16	13.78	8.50	10.17
Asian	8.81	12.47	15.07	11.48	11.79
Hispanic					
Income					
Less than median	10.37	10.63	13.34	10.72	11.19
More than median	12.03	11.71	11.09	15.47	11.01
Education					
Some college	10.31	10.70	12.54	12.77	11.82
College degree	11.51	11.32	12.48	12.34	10.75
Number of Lines					
Gender					
Men	7.89	9.99	9.80	12.62	10.12
Women	12.72	11.67	14.12	12.43	11.61
Race					
White	11.69	8.52	8.57	13.74	9.43
Black	9.26	10.44	11.11	9.08	9.88
Asian	12.74	17.30	20.47	15.77	16.31
Hispanic					
Income					
Less than median	11.79	13.33	14.38	13.29	13.12
More than median	10.26	3.33	9.36	11.19	8.60
Education					
Some college	10.22	10.74	11.20	13.23	11.38
College degree	11.56	11.29	13.28	12.06	10.97

Source: Transcripts of the deliberations

On an average, at Site B, there was parity in the total speaking time of men and women (the total average time for women includes the participant who dropped out after the first face to

face weekend); though consistently women spoke on an average more than men on all days except the last day. But this is also due to the fact that the participant who accounted for nearly a quarter of the total participant speaking time was a woman. In the race/ethnicity categories, the high figure for Asian is on account of the same participant. She was a participant who possessed "deliberative capital"; she could support her opinions with justifications and she often provided a number of reasons for one opinion. She had a college degree and her job experience enabled her to be well-informed about the regulatory framework and the work of agencies like the FDA. "*I really did not know much about nanotechnology at all before. I figured it is some kind of weird esoteric science from the physicists. So it was pretty interesting to learn like this was actually really relevant to the things that I am interested in and has a lot of social repercussions but I feel like that there is not much of a public dialogue about it, so I am pretty excited to just learn more and see how that fits in which work I do so*." In her introductory remarks she talked about connecting developments in NBIC with her work. Her major concerns were the regulatory framework, everyday applications of nanotechnology and workplace safety and workers' health.

5.3 Speaking time and the internet sessions

The "speaking time" of the participants during the internet sessions was controlled more strictly by the moderators. They could only post their comments to the group when they were chat active but could send messages to other participants and the moderators. However, these side conversations were not encouraged by the moderators and participants were often asked to refrain from posting when they were not chat active. There were other factors that acted as controls. Many times participants stated that at times they had difficulty logging on or kept getting booted off the system.

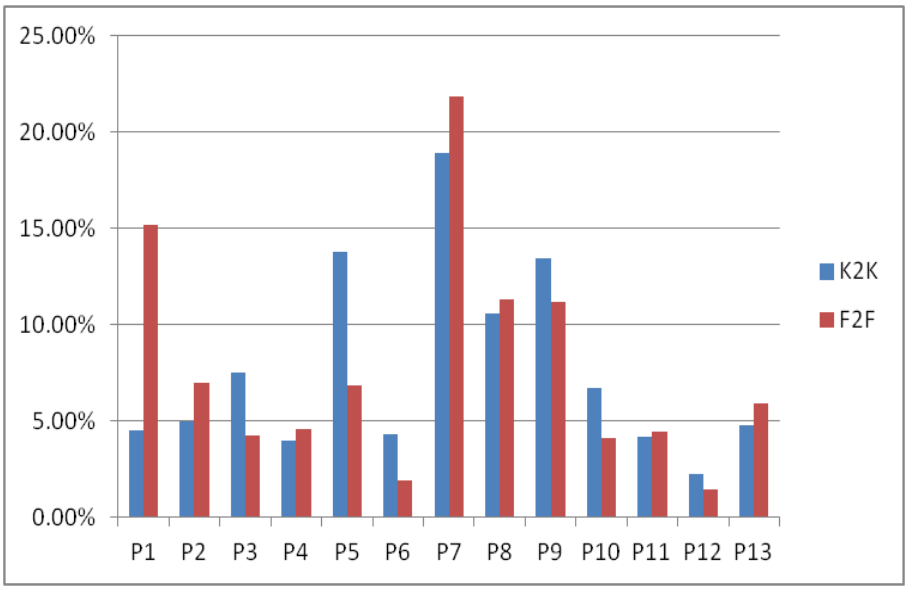
To compare the speaking time of participants I use the number of lines spoken by each participant as a total of all the lines spoken by all the group (Site A or Site B) participants. The individual differences between the speaking times online and face to face are striking in the case of a few of the participants (**Figure 9**). In Site A, six of the participants spoke more during the internet sessions as compared with their speaking time during the face to face deliberations. Three of them were women as well as non-white. One of them was the only participant at both sites who answered that she preferred discussing controversial issues over the internet rather than face to face in the post survey. The other two were non-white men, one of whom did contribute substantially to the face to face deliberations. The fifth was a participant who contributed negligibly to the internet sessions. In Site B, there were three participants who spoke more during the internet sessions as compared with the face to face deliberations (**Figure 10**)- two men and a woman. The woman participant also spoke the most online as compared with the rest of the participants.

Similarly, there were participants who spoke more during the face to face deliberations but who hardly contributed to the internet sessions. The way the NCTF online sessions were structured was a cause of dissatisfaction and it did cause a lack of engagement with the online deliberations. Numerous sessions were spent constructing and prioritizing questions during which the role of most participants was that of an observer. In some cases the character of online synchronous communication was the reason for limited participation. One of the participants in her interview mentioned that the internet sessions felt as if only those who can type faster get to make their point. *"I did not really participate unless I was asked a question. It was taken over by who could type the fastest and press the send button quickest- it was like being in a bossy chat room where people try to take over. I don't participate in chat rooms, it was different, it was*

uncomfortable and I didn't care for that aspect". Rather than actively engaging with other participants she preferred reading the transcripts of the session. The format of the internet sessions did hinder participation for certain participants. Delborne et al. (2011) in their evaluation of the online component of the NCTF find that the structure of the online sessions limited the participants' autonomy and led to a low degree of engagement with the process online.

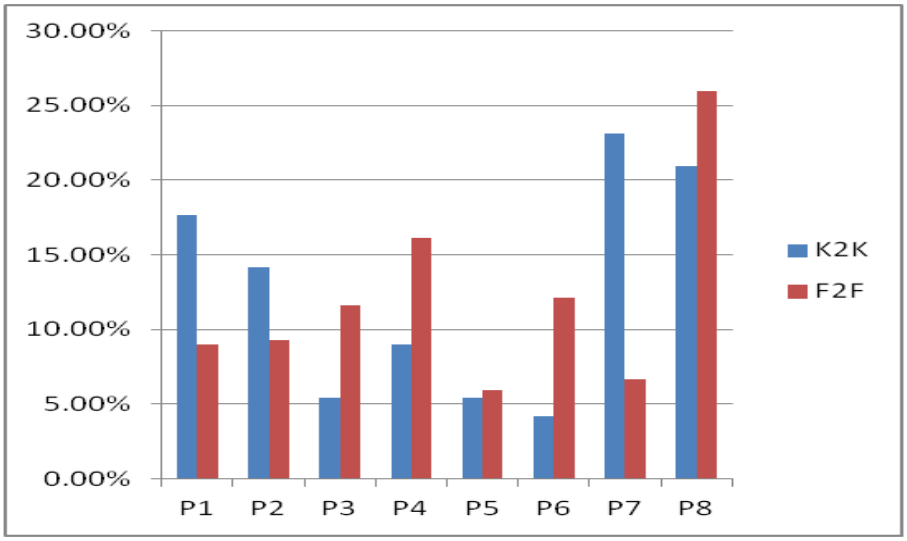
On the other hand, one of other participants in her interview mentioned that the online sessions were informative and she enjoyed the online interactions as they allowed her to contextualize the scale of the project as well as interact with participants from the other sites. "*It was executed well".* A few of the other participants also thought that the interaction with participants from the other sites was interesting. The survey data provides an indication of the participants' experience of the internet sessions. The survey asked participants whether they preferred online communication or face to face communication while discussing controversial issues. 21 participants answered the question in both the pre and post survey and 13 (62%) changed their preference. Out of these, 11 changed their answer from equally preferring both modes of communication to preferring face to face communication while 2 moved in the opposite direction from preferring face to face communication to preferring both modes of communication equally. 8 responses remained unchanged and there was only one participant out of this number whose response remained unchanged from preferring online communication.

There were individual preferences at play rather than any group effect. And I could not find conclusive evidence of my hypotheses that the less powerful members will contribute less to the internet sessions due to the lack of active facilitation that is sensitive to the differences in participation rates.



Note: Participant 13 was not present during the last face to face weekend
Source: Transcripts of the face to face and internet deliberations

Figure 9: Internet speaking time and face to face speaking time of Site A participants



Note: the number of participants is 8 as one participant dropped out after the first face to face weekend
Source: Transcripts of the face to face and internet deliberations

Figure 10: Internet speaking time and face to face speaking time of Site B participants

There are certain group differences while comparing average speaking time online and in face to face deliberations. On an average, the non-white members and those who had an income

less than the median spoke more online in Site A while in Site B those with income less than the median and the white members spoke more online. As mentioned earlier in the chapter, these differences are on account of one individual or two and cannot be taken as conclusive of group differences.

Table 7: Comparison of Average speaking time in Site A

	K2K	F2F
Women	6.51%	6.63%
Men	8.70%	8.60%
Non-white	7.71%	5.32%
White	7.66%	10.44%
Income less than median	9.40%	7.58%
Income more than median	7.16%	7.26%
Some College	6.77%	8.53%
College Degree	8.10%	7.31%

K2K = keyboard to keyboard or internet sessions
F2F= face to face deliberation
Source: Transcripts of the face to face and internet deliberations

Table 8: Comparison of Average speaking time in Site B

	K2K	F2F
Women	12.80%	13.25%
Men	12.00%	10.12%
Non-white	11.83%	12.45%
White	13.61%	11.45%
Income less than median	13.67%	9.40%
Income more than median	12.11%	14.99%
Some College	6.22%	11.38%
College Degree	16.27%	12.49%

K2K = keyboard to keyboard or internet sessions
F2F= face to face deliberation
Source: Transcripts of the face to face and internet deliberations

5.4 The Role of Facilitation

Facilitation plays an important role in any task-oriented group process. The facilitator treads a fine line trying to balance the task with ensuring inclusive facilitation. He or she has to move the process along without influencing the outcomes. Bostrom et al. (1993) describe

facilitation as a ". . . set of functions or activities carried out before, during, and after a meeting to help the group achieve its own outcomes. The essential characteristic of facilitation is to help make an outcome easier to achieve" (p.147). Impartiality is at the heart of a facilitator's role for the facilitator has to help a group achieve its outcome without influencing the content (Griffith et al., 1998). And a large share of the responsibility to make deliberations inclusive falls on the facilitator's shoulders.

There were two facilitators at both Site A and Site B. In Site B, Facilitator 1 had training and experience in facilitation and had a fair amount of knowledge about nanotechnology but not about NBIC technologies in particular. Facilitator 2 did not have any formal training in facilitation but had assisted in facilitating focus groups and stated that she had knowledge of nanotechnology, in particular of the regulatory system, but not of human enhancement technologies. The facilitators in Site B had kept aside some time on the first day of the deliberations to answer "factual" questions on the topic and throughout the process the participants addressed information seeking queries to the facilitators. In Site A, Facilitator 1 had no training in facilitation and had experience in committee work and in conducting graduate level seminar classes. She did not have any prior knowledge of human enhancement technologies but had participated in meetings at CNS-ASU and had knowledge of the subject in that context. Facilitator 2 had no formal training in facilitation but had a lot of experience in facilitation including strategic planning exercises. He did not have any knowledge of nanotechnology or human enhancement technologies. Both the facilitators did not deal with any technical questions. Facilitator 2 in his interview stated, "*I felt it wasn't my place to answer specific question about the technology. I would have to refer them to an expert- I felt it wasn't my domain."*

The facilitators conceived their role similarly though they emphasized different aspects of it. All four facilitators talked about the need to meet the objective of a project. Facilitator 2 at Site B talked about the importance of not influencing the deliberations and ensuring that equality in participation. The facilitators' role is "*to meet the objective of the exercise by staying true to participants opinions without putting words in mouth and without letting a few dominate*." For Facilitator 1, who facilitated the majority of the discussion in Site B, producing a set of policy recommendations was important. The facilitator's role is"…*context specific- in this context the job was to produce a consensus report-to take all that input and produce a policy recommendation and none of them (*participants*) had any real policy experience*". Both the facilitators in Site A talked about the importance of meeting the goals of the project without influencing it. Facilitator 2 at Site A defined a facilitator's role as akin to that of a traffic cop who directs the traffic without driving the cars. The job of the facilitator is to get the group to stay on task, "*organize the discussion but have no role in it, sometimes act as a catalyst to move it along*." For Facilitator 1 it was also important to ensure that everybody has had input into the process – "*a personality appropriate role*". The problem of a personality appropriate role, however, does not lend itself to easy solutions. How do you draw out the quieter participants who are not contributing to the discussion?

Facilitator 1(Site B) also listed "*pulling the quieter ones out without pressing them too much*" as a challenge but "*volume is not important*". As the following excerpt from the deliberations shows, calling upon a participant does not always get them to contribute.

Excerpt 1

> **Facilitator**: Participant A do you want to, kind of quiet this morning.
>
> **Participant A**: My brain's not working right now.
>
> **Facilitator**: Participant B.
>
> **Participant B**: I am just digesting it all right now.

5.4.1 Facilitator Elicitations to include less powerful

The coding category "elicitation" was used to code those facilitator statements that sought the opinions and views of participants. Elicitation (general) was differentiated from Elicitation (specific). The former refers to those statements that elicit the opinion of the group and are not addressed to anyone by name while the latter refer to those statements that are directed to a particular participant and mention him or her by name (**Table 9).** In addition to these coding categories, I also looked at clarifying questions asked by the facilitators that were addressed to particular participants asking for clarifications regarding a previous statement made by the participant. **Table 9** presents the data for these statements.

Table 9: Facilitator elicitations and clarification questions

	Day1			**Day2**			**Day3**			**Day4**		
	ElS	ElG	CLQ	ElS	ElG	CLQ	ElS	ElG	CLQ	ElS	ElG	CLQ
SITE A												
F1	22	67	10	27	54	4	8	17	5	25	103	37
F2	4	30	3	6	33	11	1	33	15	1	1	0
Total	26	97	13	33	87	15	9	50	20	26	104	37
SITE B												
F1	23	16	12	24	78	20	15	49	15	54	200	60
F2	23	3	2	23	25	4	1	3	1	0	0	0
Total	46	19	14	47	103	24	16	52	16	54	200	60

ELS: Elicitation (Specific)
ELG: Elicitation (General)
CLQ: Clarification Question
Source: Transcripts of deliberations

An analysis of the transcripts and the video recordings shows that the Elicitation (specific) statements were used to call upon those participants who had raised their hands to contribute to the discussion. At both sites, the facilitators kept a record of the order of show of hands and called upon the participants in that order. There were only a couple of instances when the facilitator called upon a participant eliciting their view opinion with regard to the topic being discussed. The abstract below illustrates such an elicitation. The participants had been discussing the issue of who will be making decisions regarding these technologies or the issue of "playing God" and after an initial statement made by a participant that money will be the determining factor the discussion veered toward factors such as personal choice, legislative policy making, and medical standards. The facilitator then intervened to include those who had touched on the issue of cost so as to bring in another perspective on the issue.

Excerpt 2:

Facilitator2: Let me get in …

Facilitator 1: I want to hear from the people sitting on that side who said money will determine.

Participant 1: I am going to say that I totally agree with him and it should be within the body of professionals or scientists too. I think its important, not just one country such as if the UN can create something like the Nobel, people that select Nobel Prize winners but what really bothers me is when our president says you can't do stem cell research because it is wrong, God told me it was wrong…

Participant 2: Embryonic stem cell.

Participant 1: …I agree with that but all of it's being ( ) at this point or most of it and a lot of embryos are destroyed anyway. It's his call because he is President but I don't like it. I think an independent body of scientists should be making this policy.

Facilitator 1: Participant A and Participant B, they said the money will make the call.

The facilitators were also cognizant of the fact that some participants spoke more than others and did open up the floor to all. The following excerpt is from the end of the third day of

deliberations in Site B when the participants had started writing the report. The group was very particular about the language of the report and the meaning that every word conveyed. The facilitators paid due care to this concern. In this excerpt one of the most vocal participants in Site B is talking and there is a lengthy back and forth with the participant and the facilitator regarding the wording of the sentences in one of the recommendations in the report.

Excerpt 3:

Facilitator: Let us get your sentence out and use your and cut across multiple …

Participant A: Cut across multiple …

Facilitator: Industries and areas of application.

Participant A: Yeah

Facilitator: And areas of application and something about unknown is here.

Participant A: And then stick in that part about and there remain several unknown.

Facilitator: And many unknowns are there, that is terrible. Sorry.

Participant A: And a great deal of unknowns.

Facilitator: Uncertainty.

Participant A: Yeah uncertainties.

Facilitator: So that is that too wacky. We can change it, large quantities of nano or any uncertainties or including any uncertainties. If you want to say uncertainty you can.

Participant A: So I guess where I am going with that is it seems to me there is no coordinated sort of government …

Facilitator: We are concerned about the seeming lack of coordination, is that what you are trying to say.

Participant A: Yeah like lack of comprehensive unified policy to address our concerns in that letter.

Facilitator: Comprehensive unified. Cohesive? No cohesive policy to manage, where are we going, apparent policies. Other people this is not, feel free to jump in. We are not trying to monopolize here.

The above excerpt also contains the clarifying statements made by the facilitators that are part of **Table 9**. The facilitators at both Site A and Site B used these to understand what the

participants meant as well as to get the participants to expound on their statements. This excerpt also sheds some light on the how challenging the last day of report writing was for both participants and facilitators. The Site B report included many more recommendations than the Site A report and each was discussed word by word while the report was being written.

There were other techniques that the facilitators used to include all the participants in the deliberations. By going round the table and asking every participant to talk and write about their initial concerns, excitements and questions and asking every participant for feedback on the internet sessions and what they learned from the experts, every participant's viewpoint was taken into consideration as the building blocks of the deliberation. Since the Site B group was smaller in size, every participant also wrote out their individual recommendations. In Site A, the larger group often broke out into smaller groups of 2 or 3 which may have helped quieter group members to contribute to the discussion. However, as these sessions were not recorded, there is no data to disprove or prove it.

5.4. 2 Facilitator Interventions

The initial coding found very few instances of facilitator interventions. The interventions usually happened when a participant started speaking without raising his or her hand. As mentioned earlier in the chapter, the facilitators kept a careful record of the show of hands to keep the discussion orderly. The facilitators at Site B while discussing ground rules with the participants raised a point about interruptions in a conversation and whether they are acceptable to the group. One of the participants said that she is an interrupter by nature and rules like raising hands are helpful to her; another mentioned that keeping some sort of record of the order in which participants raised their hands was useful for orderly interaction. Another participant

talked about how much space each participant should take up in the conversation. *"I think it is really important for all of us to try to be conscious of how much space we are taking up when we speak as well as conscious of the fact that we are all here with different experiences and different communication styles and I think it is really important to be gentle and to be nice despite like differing opinions."* A little after that statement a participant did ask about the space each participant can take up in the deliberations. The following abstract is from this conversation and shows that the participants decided to be flexible with regard to limiting the time one can talk.

Excerpt 4:

Participant A: Are we going to limit the time limit, how long we can respond to and answer or do we just speak our piece, you know sort of blustering out.

Facilitator: What do people think?

Participant B: No.

Participant C: Well it is something we could play by ear and if it gets out of control then do something about it.

Participant D: Because there maybe some areas where the amount of time we will need it to be longer than others.

Facilitator: Okay, other thoughts. Alright so it sounds like we are kind of open but I think it is a good thing …

With regard to interruptions, one of the participants did mention guarding against what she termed as "emotional spontaneous response". "*I would say and it is probably unspoken or written in different ways up there is maybe we want to guard against argumentative and I am not going to say this right, but you know what I mean if somebody is saying something and it just really brings out an emotional spontaneous response, I think we need to guard against that when someone is speaking like if somebody is talking about something and then you think oh no that is*

so wrong, yeah I agree with that because it interrupts their flow of what they are saying and it would not really be appropriate."

The following excerpt is from the third day of deliberations at Site A. The participants had been discussing their concerns that they had listed and categorized during the first weekend. The participants were discussing extending human lifespan as a result of human enhancement techniques. When a participant started speaking out of turn, the facilitator intervened to remind her that it wasn't her turn. After the next speaker had finished, the facilitator asked the participant who had interrupted whether she wanted to add to the conversation.

Excerpt 5:

Participant A: You know loving our job for 100 years and here you go now you're going to, you know what you're going to do?

Participant B: My brother asked me why I bought my house so far away from, I mean it's not that far I just don't want to hear him scratching his ear at night, you know I want some space and the way it's working then we see (inaudible) then put something on (inaudible) yes, yes and there is only so much oxygen now, only so many trees, we're killing all those, you know for the sake of what?

Participant C: Money

Participant D: Yes….

Facilitator: Participant E is next.

Participant D: Sorry, I didn't raise my hand.

Participant E: If you're kind of being saying you can live to be a 100 years old and you can have the quality of life that you have right now or you be 200 I am going to tell you that I would choose a 100 and I would do that because in the experiences I've had and I think about how the world operates and how technology itself, whether it's nanotechnology or just space technology there is always these quantum leaps in advancement and they happen at these intervals, so if you give me that option of I've got a choose a 100, you know what if I have a extra 20 years that I can contribute something to society, to my family, to advancements in technology because I know from my experiences that these things happen every 5 or 7 years give me 21 years to make some contribution then I am going to, I want somebody else to have the opportunity to get that other 20 years as well in their life and then you know turn me off….just turn my battery off and I am off. Then the other guys will come up they have been able to gain from the experiences of the people who go that extra 20 years then those folks go along and here comes the next group, so we still have this sort of natural progression of it and the thing that happens for me there is that as you said there is not enough room on the planet, well I am not so selfish I don't want to be 400 years old, so cut me off at 100 let the next group come through. And then we got a systematic way that this planet will hopefully support and yet we got to live a little bit longer with a good quality of life and make a contribution, makes sense to me.

Facilitator: Two more comments on this and then may be somebody can make a really strong statement for enhancements and somebody can make a really strong statement against (inaudible) ends of the spectrum, but there were some other folks willing to get in before, you still want to get in, **Participant D**?

Participant D: I just want to say, I mean I am a big proponent of personal choice and I am also a big proponent of advancement and technology and these advancements are going to happen whether we allow them to happen here or not they are going to happen. Some private owned sector is going to go on their own private island and they're going to come up with these things, you know. So we can't stop it and I think that you have to let it happen, but I think that we also have to really protect personal choice and you know and it kind of talking about suicide, you know it is unfortunate that if you try to commit suicide and you fail it is going to affect other people. It is going to affect tax payers and I don't know how you can overcome that, but I don't think that suicide should be a personal choice that's taken away. So I mean that's the only thing that I can say about it, I think we should have a choice.

While transcribing, I kept in mind the concept of turn taking and overlapping turns used in conversational analysis. Sacks, Schegloff and Jefferson's (1974) study of turn-taking in everyday interaction is a seminal study of how everyday interaction is organized by systematic turns at the conversation by the participants. The smooth transfer of turns takes place at a "transition relevance place" that may be words, phrases or non-lexical utterances and is managed by those participating in the conversation. If there are many speakers and the current speakers has not identified the next speaker, then the floor is open which provides an incentive for the next speaker to begin talking as close as possible to the "transition relevance place" leading to overlapping talk. Most of what initially appear to be interruptions while reading the transcripts were actually instances of the next speaker starting very close to transition relevance place. The following excerpt is from the third day of deliberations at Site B where the participants are presenting a short summary statement about what is most important to them and should be part of the report. In the sixth utterance of the excerpt, "or" is taken as a transition relevant place by the next speaker and the conversation moves back and forth between the two speakers. Davies et al. (2006) term this back and forth between speakers as "dueting" and identify it is as one of the discursive features of deliberation in their case study. "'Dueting' often occurs, or the finishing of each other's utterances or chains of thought. Speakers often end on a question that then draws an answer from another speaker, a clarification, or a new example from a previous speaker" (p. 202-203). Dueting was also observed at both Site A and Site B. There weren't any instance when a speaker was interrupted such that he or she could not complete his or her chain of thought. As it was stated earlier both the facilitators and the participants in their interviews mentioned that the participants were respectful toward one another.

Excerpt 6:

1 Facilitator: Summarize yourself to what you want to share so I am not forcing anyone but we are just, try and get more things after having reflected. What is really you know you can put it in one or two or three words, what is important that we get into this report.

2 Participant A: Our values.

3 Facilitator: Okay, what else.

4 Participant B: Proactiveness, reversibility.

5 Facilitator: Okay.

6 Participant C: When we are talking about reversibility are we saying that first we do not implement it or …

7 Participant B: I would say more cautious about things so we do not create a situation that we cannot undo unless we are sure the benefits will outweigh the cons. Because if we do something we do not like the effects and it turns out to be bad and we can undo it and that is finally good but if we do something that we can reverse then that is really I think the heaviest consequence of all.

8 Participant C: Right.

9 Participant B: If we cannot take it back.

10 Participant C: But how are you going to know unless we actually put it out there.

11 Participant B: I do not think we will ever know for sure that is why argument personally is let us make sure it goes through as many tests and checks and clearances

12 Participant C: So then they do have go out, they should come up with a timeframe for each because if we wait to see if we cannot reverse it, it may take too long to develop

14 Participant B: Well, I think it is a public approach in the technology.

15 F1: Hold on, timeframe what did you mean.

5.4.3 Inequality in Facilitator speaking time

The analysis also reveals an inequality in speaking time of the two facilitators at both the sites. The two facilitators alternated between facilitating the discussion and writing and note-taking on the white-boards and the computer. The speaking styles of the facilitators did account for the differences in speaking time but the main reason was that the different facilitation tasks were not evenly divided. As shown in **Figures 1-8**, the differences in speaking time between the

facilitators across the four days are quite evident. In Site A, Facilitator 1's speaking time accounted for 21.17% of the total speaking time while Facilitator 2 accounted for 11.84% of the speaking time. The two facilitators took the lead during different sessions on the first three days but the fourth day sessions were mainly facilitated by Facilitator 1. During the fourth day of the deliberations the group was writing its final report and instead of alternating between the two facilitators, Facilitator 2 asked Facilitator 1 to continue moderating the deliberations in order to maintain continuity.

In Site B, Facilitator 1 speaking time accounted for 37.18% of total speaking time while Facilitator 2's speaking time made up 9.81% of the total speaking time. The sharing of facilitation tasks was more unequal in Site B. Though, Facilitator 2 facilitated the discussion during some of the sessions during the first face to face weekend; during the second face to face weekend, Facilitator 2's tasks were mainly note-taking, recording the discussion and typing the report.

There were status differences between the two facilitators at each site. The lead facilitators were of different genders but both were white and "senior" in terms of the professional hierarchy.

5.5 Use of Narratives and Personal Experiences in Deliberations

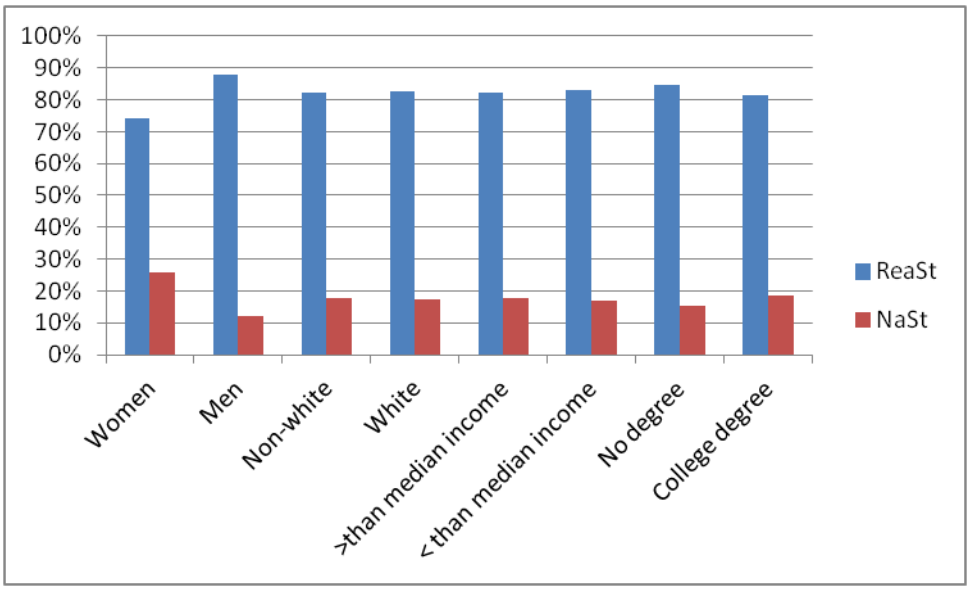
The kind of justifications used by participants to support their claims and opinions has been debated widely by deliberative democracy theorists. Valid deliberative talk is defined as reasoned argumentation. Participants have to express their viewpoint through reasons that the other participants find persuasive. The difference theorists (Sanders, 1997; Young, 1996, 2000), on the other hand, argue that stories and emotive talk has a valuable place within deliberation.

The emphasis on reasoned argumentation privileges certain groups- men, white people, and the more educated. Not only do they possess this deliberative capital, they are also perceived as being able to provide better and good reasons. Also, the emphasis on providing justifications that appeal to shared norms functions to universalize the norms of these powerful groups and diminish the particular experiences of marginalized groups. Stories are means by which the less powerful can bridge these differences as they can voice their particular experiences and be heard by the more powerful (Black, 2008, 2009; Poletta and Lee, 2006; Ryfe 2006).

Poletta and Lee (2007) argue that others listen to these stories in the expectation that it will make a point that will be relevant to their experience. In their analysis of the use of story-telling in online discussion groups, they find that reasoned justification was a lot more common than the use of stories to support opinions. They found that women were more likely use narratives as compared with men but more importantly, those who perceived themselves as having marginal opinions and experiences used more narratives as compared with those who did not perceive themselves in such a fashion. Black (2009) argues that "stories are important ways that people construct their identities, and telling and responding to stories help group members negotiate the tension between their individual and collective identities" (p. 99). They give rise to empathy as the listeners can understand the storyteller's perspective. She categorizes stories into different types based on the role they play within the deliberation. Stories can support an argument or they need not. Adversarial argumentative stories are used to support a particular perspective while unitary argument stories focus on building a consensus in order to support a claim. The non-argument stories-introduction stories and transformation stories have an important discursive part to play in moving the conversation on. Black argues that facilitators should be aware of the purposes these stories fulfill and use them to further the discussion. Ryfe

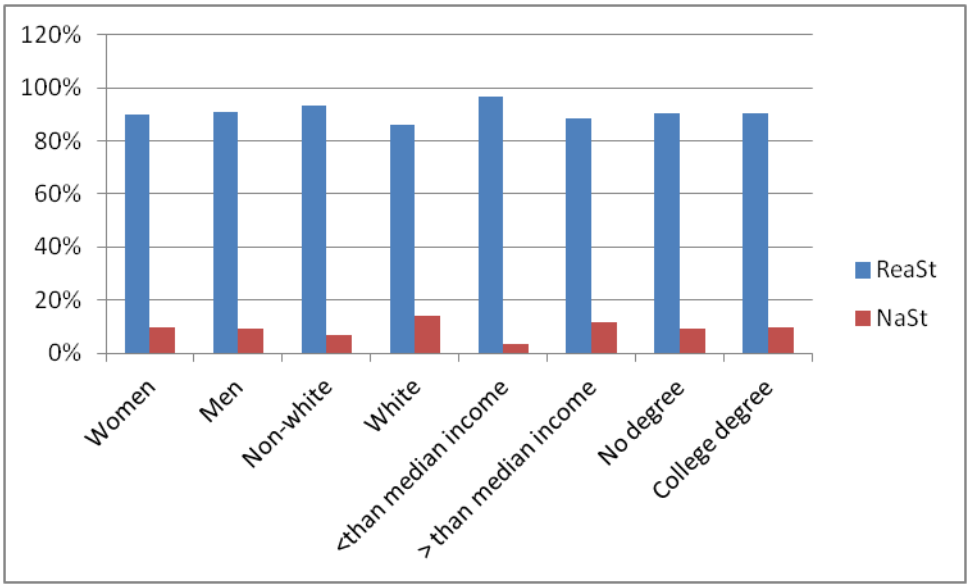
(2006) argues that the style of facilitation has an influence on the use of narratives within a group. Strong facilitators do not allow narratives to develop due to their style of facilitation which leads to a faster pace in the deliberations that does not permit participants to think aloud and mull over their opinions and preferences. Davies et al. (2006) in their study of deliberative participation in health care decisions find that story-telling was a common discursive style used by participants. But they observed a complex pattern of "permission and censure" around the use of personal narratives with the facilitators at times not being welcoming to personal narratives.

Based on the arguments of the difference theorists, I hypothesized that members of the less powerful groups will use more narratives in their arguments. However, the analysis reveals that reasoned argumentation is much more common in deliberative talk than the use of narratives. There were differences in their use in both sites.



ReaSt= Reasoned utterances
NaSt=Narrative utterances
Source: Transcripts of deliberations

Figure 11: Reasoned and Narrative Utterances as percentage of total justified utterances' in Site A



ReaSt= Reasoned utterances
NaSt=Narrative utterances
Source: Transcripts of deliberations

Figure12: Reasoned and Narrative Utterances as percentage of total justified utterances' in Site B

At both sites, participants used narratives to express unfamiliar ideas. They were also used to illustrate a preference being expressed. The "expert" participant used it as a means to talk about scientists and science, about the ethical dilemmas faced in their work; a woman participant used them to express her conservative views about life and personal choice; another woman participant used them to voice her experiences with technology and body implants and the changes in her quality of life as well as to challenge some of the views in the background materials; another non-white, woman participant used narratives to express feelings of powerlessness and the importance of equity; others used stories of family members, movies seen and books read, experiences in their work place as forms to justify their opinions and preferences and to substantiate or to agree with another participants' viewpoint. But not all participants told stories.

At both Site A and Site B, reasoned utterances were more common than narratives and stories. In Site A, woman used more narratives than men. But narratives were used less in deliberation by the Site B participants as compared with the participants in Site A. Ryfe (2006) argues that facilitation has a role to play in how many stories are told by participants within a deliberative forum. The presence of strong facilitators, or those who "moderate forums by interjecting themselves frequently in into the conversation" (p. 87), leads to participants telling fewer stories. Deliberations characterized by the presence of strong facilitation have a faster pace, more participants to facilitator interaction and less "thinking-out-loud". In such a context, stories are rarer. As I discuss later, the facilitation in Site B was more in line with this type of facilitation that may have resulted in lesser use of narratives by participants.

Within the category of reasoned utterances, reasoning that used analogy or was based on shared values was more common than that cited evidence or facts. Largely, the future-oriented

nature of the topic was the cause for the relatively lesser use of factual evidence as justification for a claim or opinion. The tension between this future-orientation and the desire to make an impact was also reflected in the Site B participants' need to talk about the existing or close-to-market "everyday" applications of nanotechnology as opposed to its future applications.

5.6 Expertise

Consensus conferences actively recruit non-experts as participants so that a different perspective is brought into the debate. With regard to expertise, Collins and Evans' (2007) detailed typology of expertise defines specialist tacit knowledge as "something attained by interactive immersion in the way of life of the culture" rather than by learning (p. 23). A form of this is contributory expertise; contributory experts are "those who have acquired it to contribute to the domain to which the expertise pertains" (p. 24). At Site A, two of the participants had research backgrounds in areas that a close connection with the topic (a research chemist and a graduate student). I had hypothesized that those participants perceived as experts will speak more than the non-experts and will be interrupted less. The expert participant who was a research chemist clearly spoke more than the other participants. As shown in **Figure 4,** 21.86% of the total lines of participant talk over the four days of the face to face deliberations were spoken by him. The next highest speaking time was 15.20%. Also, there was a variation over the four days (13.23%, 24.74%, 22.65%, and 25.08%) with the first day percentage being the lowest. Two of the interviewed participants had mentioned that the group was interested in hearing him speak on account of his knowledge and expertise so the increase in speaking time after the first day may be on account of the of the fact that the other participants were giving him that space. When the group reconvened after the small group session, he was also the speaker for the group when

reporting on the smaller group discussions. However, as mentioned earlier, speaking time and influence need not be directly correlated but it is clear that the expert participant contributed more to the deliberations in terms of speaking time than any of the non-expert participants.

In case of the second participant who had more specialized knowledge about nanotechnology than the other participants, her speaking time was much less than many participants. It was higher on the first day and then tapered off, starting from 9.86% (the third highest of all participants) on the first day it went down to 2.95% on the third day (she was not present on the last day of the deliberations). She was not very voluble but she had strong and clear opinions and arguments as evident from the first day deliberations where she often asked clarifying questions to other participants in order to understand their points of view and clearly expressed her disagreeing viewpoint. I cannot account for the cause of her declining participation from the contents of the transcripts. However, she did not make any claims to having specialized knowledge regarding the topic of deliberation unlike the other "expert" participant who made a mention of his scientific training and background as well as his work in the human transplant area as well as his work with nano-scientists in industrial research. His initial remarks on the background material contained a reference to his training and his interest in the subject-"*When I went through this treatise, because I am a research scientist by training, I was fascinated. A lot of it I was aware of and a lot of it I was not but thought at some point in my career I would see something like that*."

In Site B, none of the participants had specialized expertise in the sciences but there was a participant who on account of a body implant had experiential expertise. She espoused a strong pro-technology position based on the positive effects on her quality of life due to the implant. Her introductory remarks contained a reference to her position on these technologies of human

enhancement, '…*what I find intriguing about this project is I really have a vested interest in the future of these technologies. I am a cyborg as defined by the background material but I prefer bionic…*" Her speaking time accounted for 16.10% of the total speaking time of all participants over the four days of the face to face interactions **(Figure 5)** and was the second highest figure for all participants in Site B. The participant who spoke the most worked in an area which is known to be heavily impacted by nanotechnology developments. She had a strong professional interest in the developments thought not strictly specialized expertise. In Site B, the facilitators could also be characterized as experts. As mentioned earlier, the facilitators answered "factual" questions on the first day of the face to face deliberations. The list of topics and questions is broad:

1. Where is nano out there now?
2. What does nanotechnology actually involve?
3. What is the benefit of nanoparticles in sunscreen?
4. Where do we stand in terms of cloning?
5. What products use nanoparticles?
6. Nano-bio research at Site B.
7. Discoveries of potential negative effects.
8. Toxicity of nanoparticles.
9. Health effects of nanoparticles.
10. Agencies involved in regulating nanotechnology.
11. Other applications of nanotechnology.
12. By-products of nanotechnology
13. Funding of nanotechnology research.

The facilitators were presenting this information as researchers in the area of governance of nanotechnology and the science policy process, the kind of "transitional expertise" that Collins and Evans (2006) talk of; "expertise in the language of a specialism in the absence of expertise in its practice" (p. 28). Even during the course of the deliberations, a number of factual questions about the technology were asked of the facilitators. This led to instances of facilitator-participant interactions rather than participant-participant interactions.

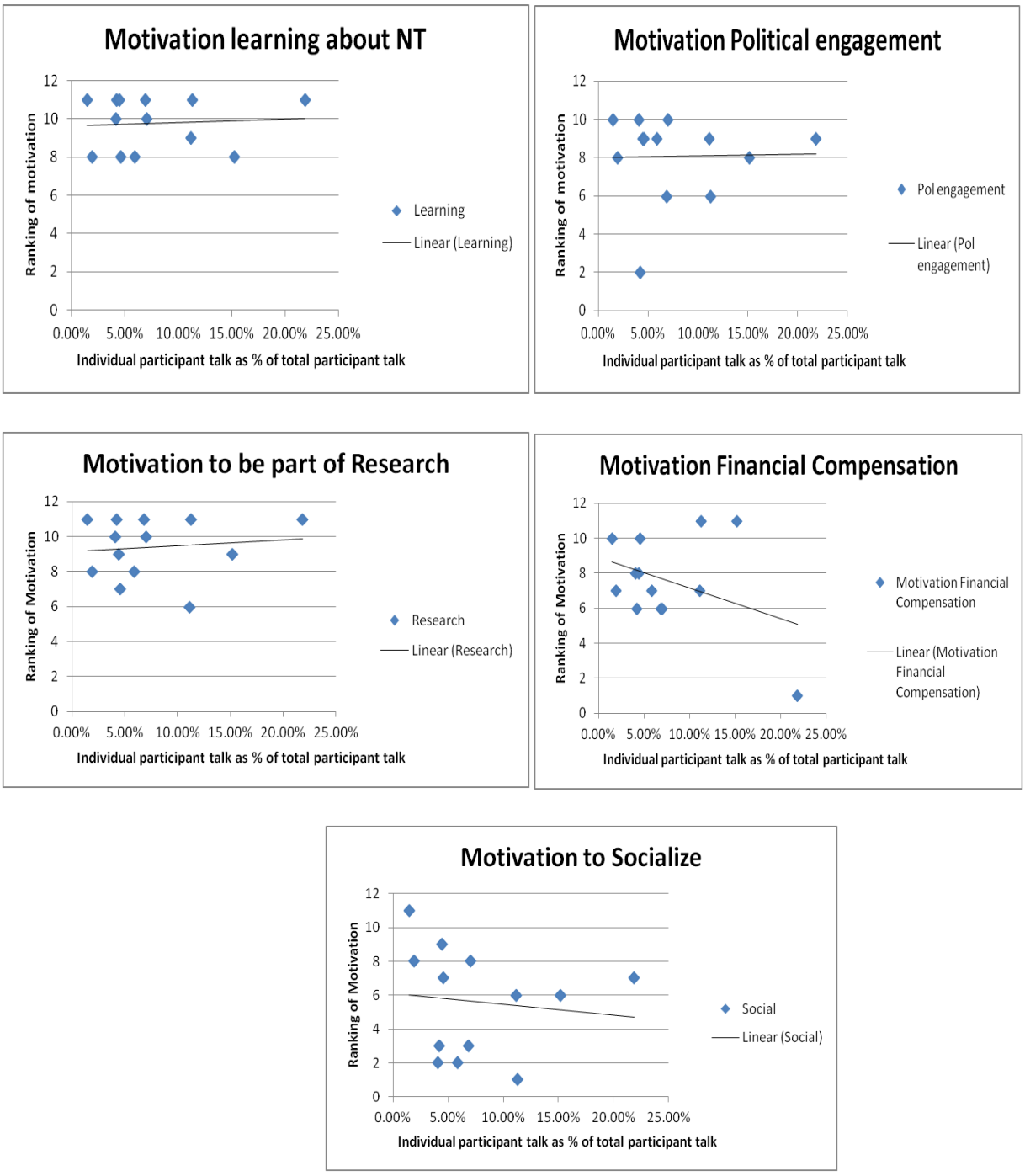
As mentioned in the previous section, instances of interruptions were few and there were hardly any interruptions that deliberately cut short a speaker. My analysis could not find any support for Hypothesis 2.2: Participants perceived as experts, that is, as having specialized knowledge of the field, will be interrupted less than those perceived to be non-experts.

These participants with the different forms of expertise were ones that the recruitment strategy aims to exclude- those with specialist knowledge and those with strong positions on the premise that their presence can distort deliberation. But these strong positions had an important role to play. The pro-technology viewpoint, for instance, was a perspective that the participants could question and engage with.

5.7 Motivation to participate and amount of speaking time

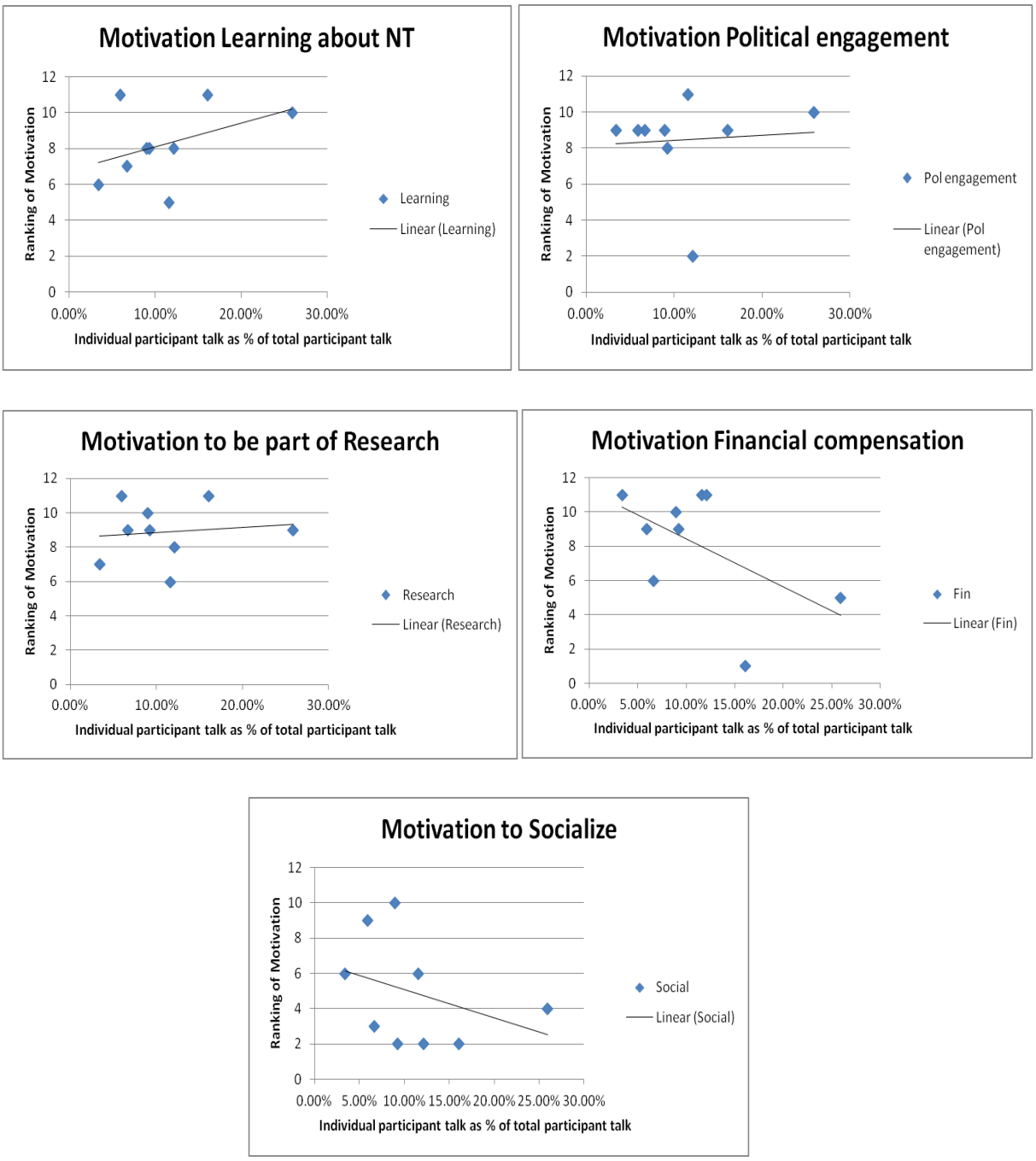
The survey data provides information on the motivation of the participants to be a part of the NCTF. The participants were asked to rank a set of motivating factors on a 11-point scale. These motivating factors were- "a personal interest in learning about nanotechnology and human enhancement; a desire to be politically engaged; financial compensation for my time; a desire to take part in current research; and a chance to socialize and meet people".

Correlation analysis of the ranking of the kinds of motivation and the amount of speaking time reveals that there was a weak correlation between the different motivating factors and the amount of speaking time. The exception was financial compensation in the case of Site B; in this group of participants financial compensation was negatively associated with the amount of speaking time (R^2= 0.29). The top two speakers at Site B ranked financial compensation lower as a motivating factor in comparison with learning, political engagement, and participation in research as motivating factors. In Site A, the correlation was weaker with a R^2 of 0.14. For the topmost speaker, financial compensation ranked lowest in terms of motivating factors while for the next highest speaker it was the strongest motivating factor. In terms of median values, at Site B, the median value for the motivating factors of political engagement, financial compensation and participation in research were the same (median value of 9). In Site A, the median value for the motivating factor learning and participation in research was the highest at 10; political engagement had a median value of 9 while financial compensation had a median value of 7. At both sites, "chance to socialize" was ranked the lowest as a motivating factor (**Table 2**).



Source: Survey data and transcripts

Figure 13: Correlation of Motivation to participate with Participant speaking time in Site A



Source: Survey data and transcripts

Figure 14: Correlation of Motivation to participate with Participant speaking time in Site B

5.8 Participants' Perspectives

An important source for understanding inclusion is the participants' perception of whether they felt included in the process. The survey data and the participant interviews provide this perspective.

Table 10: Participants' perspectives on the final report

	Number of Responses	Site A	Number of Responses	Site B
The report recommendations accurately reflect my individual preferences				
Strongly agree	13	8	7	3
Agree	13	4	7	3
Neutral	13	1	7	1
Disagree	13	0	7	0
Strongly disagree	13	0	7	0
Which statement more accurately reflects your views				
I personally endorsed almost every major point in the report	13	11	7	6
I personally objected to a few of the major points in the report	13	2	7	1
I personally objected to many of the major points in the report	13		7	0
I personally objected to almost all of the major points in the report	13		7	0

Source: Survey data

As **Table 10** shows, the majority of the participants (61.54%) strongly agreed with the statement that the recommendations contained in the final report accurately represented their individual preferences, the percentage who strongly agreed with that statement was less (42.86%) in Site B. But there were no participants who disagreed with the statement and only one participant at each site was neutral about the statement. With regard to personal endorsement of every point in the report, a high percentage of participants (84.62% in Site A and 85.71% in Site B) said that they personally endorsed almost every major point in the report. The sole

participant in Site B who said that he or she personally objected to a few of the major points in the report was clear in stating the objections during the deliberations as I will discuss in the next chapter. However, one of the participants in Site A who said he or she objected to a few of the major points in the report was not present on the last weekend that was devoted to report writing. Presence may have helped change that perception or provided an opportunity for others to reflect on a different perspective.

All six participants who were interviewed said that they were provided sufficient opportunities to speak and all felt that their views were heard by the other participants. They described the deliberations as "*open", "it was an open forum and we were all able to express our opinions. We respected each other",* "*It was open- we could laugh with each other and talk about our experiences*', "*The participants were respectful*". With regard to the question whether there were participants who dominated the discussion, all six reported that there were some participants who did so but considered that natural and as not having a negative effect on the deliberation process. Three of the Site A participants did mention the participant who had a science research background as someone who dominated the discussion on account of his knowledge. *"Yes and no. (Participant)–we encouraged him because he had the knowledge. His position was because of his knowledge and his background was something that we were interested in*." "*People deferred to him because he had more knowledge than the rest of us did."* A female participant attributed domination to personality, "*Also personality- there were a few males who dominated but that is usual*." Both the Site B participants recalled a couple of participants who dominated the discussion but did not consider it a cause of concern. *"Two participants dominated- they were the passionate ones but it wasn't detrimental to the others", "Dominated but not obnoxious- they had good points-nobody sticks out- those who dominated*

were more knowledgeable, more articulate or had more concern…people were open to people being more dominant in the discussion."

With regard to facilitation, all the interviewees thought the process was well facilitated. Participants thought that the facilitators "*created a good atmosphere*", "*the facilitation was really good-made sure everyone was heard", "(Facilitator) was great facilitator- not biased – gave us room. Wasn't leading, very neutral, very positive", " Facilitators managed it with – best way to describe it- would be humor, they were very good natured, patient, and were adept at directing the group and overcoming any points where we got stuck. They were able to stir us to the next subject. The two worked well together and worked well with the group".*

5.9 Conclusion

Equality of speaking time was missing at both Site A and Site B. There were participants at both sites who contributed disproportionately more to the total deliberations than other participants. The experience of the facilitator had no role to play in ensuring equality of speaking time. With regard to speaking time, the facilitators let the participants' control how much each contributed to the deliberations. They did not intervene to ensure equality of speaking time. The participants perceived to be experts spoke more in most of the cases as did those who had a strong interest in the development of these technologies. Interruptions that disturbed the speaker did not occur regardless of who the speaker was. The participants were respectful of others as they were speaking and there weren't any interruptions that cut off a speaker mid- sentence.

With regard to the online deliberations, the format of the internet sessions did limit the contribution of some of the participants but my analysis did not reveal conclusive evidence to support the hypotheses that the less powerful members will contribute less to the internet sessions due to the lack of active facilitation that is sensitive to the differences in participation rates. I

formulated my hypotheses on the basis of research that reveals active facilitation to be an important factor in drawing out quieter participants as well as those participants belonging to less powerful groups. The research on participation in online deliberation, however, presents inconclusive results regarding participation rates of individuals based on gender and status. My analysis also revealed individual differences rather than differences that could be attributed to group membership.

The "expert" participants or those participants with specialized knowledge of the topic as well as those with a strong opinion or "interest" in the topic were the participants who spoke more than the other participants. The only exception to this statement was the female, black graduate student whose participation rates declined with time. In her case, her knowledge of the topic should have lead to a larger share of the speaking time of the participants but that was not the case. As compared with the other "expert" participant she did not make any claims to being more knowledgeable than others. In terms of status characteristics, occupation or job experience were more important predictors of voice than gender and race. The other important predictor of voice was a strong or "vested" interest in the technology.

CHAPTER 6

INCLUSION MEASURED BY RECIPROCITY AND REFLEXIVITY

Inclusion is also a matter of reciprocity and reflection. The rules of engagement and effective facilitation are not sufficient in themselves to ensure participation and inclusion of all participants. Inclusion also requires reciprocity on the part of participants; the willingness to engage with others, question and respond to their claims, and acknowledge and affirm their presence. Finally, it requires reflection and reflexivity on the part of the participants. Reflection refers to the extent to which other viewpoints are heard while reflexivity measures learning, the degree to which there is a transformation in the original position of the participants after engaging with other perspectives. An internal process, it is often difficult to measure. I use the coding category of reciprocity to capture aspects of these processes. Utterances by participants were coded as reciprocity if their statements questioned others; sought clarifications, elaborations or additional information; sought others' opinions; or affirmed the other person or referenced a point made by them. These statements address another participant by name or use singular pronouns. A count measure, it counts the number of times participants used such utterances.

In order to measure their percentage as a proportion to deliberative talk, I focus my analysis on the section of the transcripts that deal with the deliberative interaction between participants rather than those sessions that were spent listing and categorizing. The whole process of deliberation has an ebb and flow and the interaction between participants varied depending on the task at hand. For instance, the interaction between participants was low during the sessions when participants were listing their concerns and questions. I take deliberative talk to be composed of opinions and preferences, reasons and narratives and agreements and

disagreements. Statements of agreements and disagreements are a measure that the speaker is responding to others. In this analysis, I consider only those statements of agreements and disagreements that reference another participant's statement and not those made by the facilitator.

6.1 Status

My initial hypotheses stated that the concerns of the less powerful members will be debated less than those of the powerful members if they differ from those of the more powerful members and that the final recommendations will reflect more the concerns of the powerful members.

The time spent discussing particular concerns is directly correlated to a participants total speaking time and was not a reliable measure. In an indirect manner it offers information if those who spoke more were also the more powerful. Instead I looked at the transcripts to identify a minority point of view that was opposed by the majority of participants and see how minority views were accommodate within the deliberations. In Site A, I could identify disagreements and differing perspectives but none of them were based on fundamental differences that the participants couldn't bridge. I could identify one such instance of disagreement in Site B. The less powerful participant **(**Participant A**)** had expressed concerns about the government using these emerging technologies for surveillance of citizens. During the first day of the face to face weekend the participant presented an opposing viewpoint to that of many of the other participants who were concerned that the existing regulatory framework was inadequate to deal with emerging technologies and needed to be strengthened. Participant A was of the view that over-regulation can stifle innovation and prevent beneficial applications from being developed. It is only when products and applications are developed and used can it be determined whether

they are beneficial or harmful. During the next day when participants concerns were being discussed he brought up his concern about the government using these technologies for surveillance of citizens especially since the Department of Defense receives the majority of funding. This point was not picked up by any other participant or the facilitator for discussion. The discussion revolved around the need for regulation to which Participant A contributed his viewpoints about over-regulation.

The last sessions on the second day were spent on prioritizing concerns and question by voting. The lead facilitator used multivoting to narrow the list of concerns. The voting sessions were somewhat chaotic as new lists of questions were added to the original list and there were additional rounds of voting leading another participant to question the weightage being given to the different lists of questions. The facilitator emphasized that the voting was only to prioritize concerns that would be discussed first and none of the additional concerns would be neglected but did not explain the rationale behind multivoting. Participant A, however, saw it as a majority vote. His frustration with the process first appears during the online sessions when the moderators actually used a system of majority voting to narrow down the lists of questions formulated by the participants to a smaller number. The following excerpts are from the online sessions were all the questions that Participant A considered important were voted by the other participants to be cut from the list. His growing frustration is evident as he starts using capital letters to be heard.

> ***3rd online session-Formulating questions***
> *Participant1: What about the military using these technologies against the general public and who is going to monitor this*
> ***6th online session-participants formulate questions and then vote for their favorites***
> *Participant1: what are the military doing with this particular subject*
> *Participant1: who will final oversight over the government*
> Participants start proposing what questions need to be cut from the list and question B is one of them. B is cut
> *Participant 1: B is important do not cut B*
> *Participant 1: YOU SHOULD CUT G*

Others propose cutting I
Participant 1: WE NEED I
Participants propose cutting I
Moderator: *Agree on cutting I. I have to admit, it's broad and vague*
Participant proposes cutting A
Participant 1: YOU NEED A
A is cut
Participant 1: YOU NEED A it will happen
Back and forth about cutting different questions
Participant 1: WE NEEDED A CONGREE WILL PLAY GAMES WITH OTHER FUNDING AND PORK IN BILLS SENT UP FOR VOTE.
One of the participants as well as the moderator realize this was important
Participant : Participant1, I tried…
Moderator to Participant 1: Participant1-You can ask A when on line with the experts.
G is cut
Participant 1: CUT H NOT G
Participant: too late Participant 1
Moderator: TEAM 5 ONLY_may vote for your favorite of the five questions voted.
9th session: questions to experts
Participant1: MY MAIN CONCERN IS THE MILITARY USING THESE TECHNOLOGIES TO SPY ON US CITIZENS
Expert: Hi Participant1-the US military? Or enemies?
Participant 1 did not answer and his original concern was not answered by the expert

At the start of the second face to face weekend, the participants provided their feedback about the internet sessions and the interaction with the experts. Participant 1 again expressed his frustration with the voting system and how the voting served to eliminate minority views.

Participant 1: Well maybe if they had taken questions down, here is my suggestion for question and several questions and then the team voted on the importance of these questions and they could have done just what was already brought out which was just address one question at a time but that way everyone could have participated in the deciding what the questions were. It was just, it was very chaotic and at times very frustrating.

Participant 2: It was amusing at the same time.

Participant 1: Well depends what your definition of amusing is

Participant 3: Yeah I agree that I think that the voting system was pretty useful and we probably could have taken advantage of that more.

Participant 4: Just speak up.

Participant A: I think like the voting part like sometimes like they would have you know like so one person would bring up like a topic and then like if you do not agree with it like towards the end they started taking stuff off and it was like sorting the important stuff.

Facilitator: So when the questions got eliminated …

Participant A: Yeah so like if you are like in the minority or whatever it is like kind of you are just taking stuff off and it is like man that was like an important question.

The next sessions were spent formulating the framework of the report. One of the participants suggested that it would be helpful if everyone wrote a short thesis statement about what they would like the report to contain and then go round the table so everyone can state their view. To which Participant 1 responded, "*I think that is a good idea because even if you are in the minority you get your point across"*. Later in the session, the facilitator again uses multivoting to prioritize five concerns that the group would focus on first while writing recommendations. While the facilitator is counting off the votes received, Participant 1again raises questions about the process.

> ***Participant 1****: Does this determine they are important like the number or is it just like*
>
> *Facilitator: It is just a crude way for us to say what we are going to work on. What we are going to focus on first.*
>
> ***Participant 1****: But I mean like why do they have like public welfare and safety has like a whole bunch.*
>
> *Facilitator: Yeah because that is just a crude way of saying that is the category that people care about and what the group you know …*
>
> ***Participant 1****: Yeah but I also care about privacy and that one has two.*
>
> *Facilitator: Well, that is a good point and so that is why we are doing this for priority, working on stuff first but there is a point in the process whether it is today or tomorrow that we will definitely ask for things that are did not get a lot of votes but people are you know might want to include. That is a very good point about the minority opinion but I totally agree.*
>
> *Participant A: I will say this like I put primarily all my votes in public welfare but like I really care about privacy. I just feel really anxious and overwhelmed when I think about public welfare just so like my personal priority which is what people probably did when voting. You know this stands like we care.*
>
> ***Participant 1****: Yeah I mean that is why I said. I think privacy is important. I just do not want to, I will shut up now.*
>
> *Facilitator: No, no*
>
> *Participant B: No, no, do not shut up.*
>
> *Participant C: I do not think privacy should be left out of the process.*
>
> *Participant B: It is important.*
>
> *Participant C: But it is just something that we work on last.*
>
> *Facilitator: What this star means that we do not want to omit privacy.*
>
> *Participant B: And we are not going to.*

Facilitator: Right, I am just reporting that that is part of the agenda. I mean this is kind of quasi-quantitative thing, quantitative methods mess up sometimes and that is why it is important as we go through this to bring these kinds of things up that is very valuable to make sure this gets into the report. (Starts talking about the priority concerns)

While working on writing recommendations Participant 1 mentions that he has written a recommendation twice *"because it is really, really important".* Finally on the last day of the project when the report is being written, one of the recommendations regarding funding is being included. The last day was focused on writing the report based on the recommendations written individually by the participants and the time spent on discussing the recommendations was limited.

Participant 1*: Can I state for the record I just, I mean I may not agree but I guess time constraints and just general (inaudible) I think.*

Facilitator: Okay. Yeah, what he's saying is that he's going with consensus there that he kind of likes the idea of financial incentives for public welfare. Is that clear?

Participant 1*: Yes. Just for the record.*

Facilitator: It's on the record we have it noted.

The final disagreement is regarding a recommendation formulated by Participant 1 about surveillance and privacy. He wanted a recommendation proposing an amendment to the constitution that would forbid government from using these technologies for surveillance of citizens. Unlike his views about over-regulation that were reasoned, Participant 1 never presented any reason for why this issue was important. It was always expressed as an opinion. The other participants were open to adding a statement regarding privacy and surveillance but were not willing to concede to the demand to insert the words "constitutional amendment". The following excerpt from the deliberations reveals how the other participants tried to elicit further information from him. They asked him clarifying questions as well as suggested alternatives that would be acceptable to all.

Participant A: I think the wording is kind of funny. Not use these technologies on or against?

Participant B: Did you mean against?

Facilitator: Is this about surveillance?

Participant C: Yeah

Facilitator: So maybe we should say that. Should we add surveillance?

Many: Yeah

Participant A: And my other thing is we can replace the word citizens with residents for people who aren't documented citizens.

Facilitator: Right. Okay

Participant C: You want to take out less

Participant D: Restriction on.. (reading from the screen). Without due process or…

Participant E: It's the process to get a warrant.

Facilitator: Yeah. That's pretty standard. Is that due process?

Participant C: Yeah

Facilitator: Okay. How's this?

Participant C: I like it.

Facilitator: Yeah. Any objections here?

Participant 1: I don't know about. We definitely need so can we take out may

Participant C: This requires?

Participant F: Yeah

Participant D: (inaudible)

Participant 1: That's the whole point because you don't want them to take it away, your rights. A constitutional amendment is hard to revoke. That's the whole point of having it anyway.

Participant C: But there may be a constitutional amendment that covers it.

Participant 1: Yeah but I mean the whole point is too make it difficult for them to take it away. (Inaudible) they may think about it but its not. The whole point is to make it difficult for them to take away your rights.

Participant D: I'm not comfortable saying that it requires.

Participant E: Because it'll be a lot harder to get the amendment into the constitution.

Participant 1: Well that's alright. I mean I think if it's gonna be seriously seen then you gotta give it to the Congress for future consideration. I think you should have.

Participant C: So you want to tell them to make. You don't want to give them a choice.

Participant 1: Well I mean they have a choice but they're not because they are not gonna read it but you have to make your point that this is, the rights of the people are very important that's the whole..

Participant E: Doesn't the amendment cover search and seizure or..

Participant 1: Not necessarily. It's a new development so it may not be covered under that.

Facilitator: May or may not?

Participant F: You know…

Participant D: I was saying would the legislation then define…

Participant 1: You are not gonna leave it out there to define because the Supreme Court or whoever they send it to may or may not agree with

Participant C: So you want to make sure it is a stronger statement.

Participant 1: A stronger statement is possible. I don't know about anyone else but myself. It's pretty important to me. You kinda wanna take the utmost precautions to protect your rights.

Participant A: Could we say like a constitutional amendment should be considered in order to guarantee these rights, in order to protect..

Participant 1: You may disagree but I just think these things are gonna be like you know with the Defense Department involved, they are gonna be pretty wide open. Already they've got the Patriot Act and all that stuff so you gonna need. It's got to be pretty strong.

Facilitator: So this is a place maybe can we find some language that would be strong and that people can live with.

Participant E: I don't think I am comfortable with anything stronger than that last sentence. That's the most difficult for me.

Participant 1: I mean if you disagree with me that's fine I can take that but its, I mean for me..

Participant A: What about if necessary a constitutional amendment should be considered.

Participant C: That's still pretty strong.

Participant A: Is that still strong language?

Participant C: I don't think I want to offend the person who (inaudible).

Participant B: I don't think they'll be offended by something like that.

Participant 1: You have to emphasize your point that this is serious, don't just leave it, I'd rather have the right than have them take it away.

Participant D: Can we say something like we find (inaudible) about this is very serious.

Facilitator: I don't want to trip it up. Look at what Facilitator2 has written there.

Participant C: Oh nice.

Participant E: Yeah

Participant D: That's good.

Facilitator: How's that?

Participant 1: I'm good with that.

Facilitator: Yeah. Should that be part of the legislation thing or it should be separate? Should this go back together? It's up to you guys.

(Cross talk)

Participant D: Do you want to say the potential of abuse is great and that is again underscoring again why.

Participant 1: It says this may require.

Facilitator: Get rid of this here. We are replacing that with this. That's the point here.

Participant G: Taking the last sentence and replacing it with the one here.

Participant 1: I think it has to be really, really strong. There is a big potential for them to..

Facilitator: We hear you. Is this strong enough?

Participant G: How about these rights must be protected instead of (inaudible)? Would that work for you?

Facilitator: Is that right? Okay, let's get rid of this.

Participant 1: I think I can live with that.

Facilitator: How about everyone else?

Participant C: Word can not bothers me. Just need to make it one word.

Facilitator: Oh

Participant C: Sorry.

Facilitator: That one is easy. Again this is important. These are serious issues. Are we happy with this? Is anyone unhappy with this?

The recommendation that formed a part of the report was: *"Legislation is needed to guarantee that the military and other security- related organizations, including the CIA, NSA, FBI, Homeland Security, and federal, state and local law enforcement, cannot use these technologies to conduct surveillance on people residing in the U.S. without due process. Because NBIC-based technologies pose a serious risk of abuse of privacy, these rights must be protected by the Constitution. To this end, it is necessary to review whether they are adequately covered in the current Constitution"*.

This lengthy abstract also demonstrates the civil and respectful nature of the deliberations. Even during moments of strong disagreements participants were considerate of differing opinions, attempting to understand those differences, and working collaboratively to come to a decision that was acceptable to all. This is true of the deliberations in Site A too. The facilitator while talking of this incident in the interview also credited the group of participants for the way in which the minority opinion was incorporated. This excerpt also demonstrates the balance the facilitators were trying to maintain between including all the participants by questioning and clarifying while at the same time balancing constraints of time and the need to produce a final report. This was a fine balance and, at times, including everyone while trying to delve into disagreements was difficult.

In Site A, there were strong opinions too. The issue of personal choice was important to many including one of the most voluble speakers; another participant's lack of trust in the government shaped her view about the regulatory system; the participant who was an expert also had ethical concerns about enhancements; another participant's reasons were often underpinned by her religious views. The diverse participants also worked well as a group. As the facilitator mentioned, "*It was a very wide ranging group. Site A is still segregated in many senses so you*

don't get such a diversity of people at the table in any other setting". A participant in his interview also commented how the diversity of the group had at first surprised him and how the group worked well together. However, there weren't any fundamental differences that had the potential to derail the talk. Every participant had concerns that were important to them and the method of prioritizing concerns and writing recommendations on each category of concern used in both Site A and Site B ensured that the final reports contained every participant's chief concern. In other words, there was something of every participant in the final report.

There were some differences among participants in Site A too regarding recommendations, their wording as well as with the recommendation itself. Conflicts and differences may have been more likely expressed in the small group sessions but unfortunately, due to a lack of recording of the small group interactions there isn't any data for these interactions. One of the differences was around a recommendation that proposed a public website that would house all the information, risks and benefits about NBIC applications around the world. The discussion on the recommendation brought up problems and issues such as privacy, marketing, and existence of unbiased information that led to a re-working of the recommendation by the group so that it was acceptable to all. A strategy that the Site A facilitators used to move on from the disagreement was to ask the smaller group making the recommendation to reword it during the breaks and then bring it back to the larger group. The disagreement was taken out of the room and resolved there in light of the larger group discussion. None of the participants in Site A stated that the wordings or the content of the recommendations was so important to them that the views of the group could not be taken into account. There also weren't any participants in Site A who held such strong minority views about values or trust in institutions that resolution

was difficult. A similar collaborative style of deliberation as seen in the Site B excerpt above was observed in Site A.

The Site B final report called for a pro-active approach to the development of human enhancement technologies while ensuring safety of human beings, protection of the environment, equitable access to benefits, and minimizing risk. The report makes specific recommendations with regard to the five major areas of concern: allocation of funding, enforcement of regulations, disclosure of potential risks and benefits, testing and approval of new products using these technologies, and public education regarding risks and benefits. Within each of these areas of concern a set of recommendations was made which were further categorized into recommendations about the policy process, environmental concerns, privacy, safety, and alternatives to NBIC products. The minority views mentioned earlier in the discussion are contained in the report. The introduction makes a mention of the view that over-regulation can stifle innovation and there is a specific recommendation about privacy and surveillance. The Site A report balances an enthusiasm for reparative applications of NBIC technologies with reservations about enhancements while also emphasizing the importance of personal choice. The report expresses a concern about regulation, policing, long term effects, equity and disclosure of information and makes a specific recommendation for each of these concerns.

6.2 Experts

My sources of data to examine the influence of experts on the second face to face interaction were the transcripts of the face to face deliberation and the interview data. I coded the transcripts for reference to the internet sessions, experts, or participants from other sides. The interview data provides an additional perspective but as mentioned earlier, the time lapse

between the NCTF and the interviews does effect the perceptions of the participants. Another source of information was contained within the transcripts of the deliberations. At the start of the third day of the face to face interactions the facilitators asked the participants for feedback regarding the internet deliberations. These statements were coded as positive or negative with relation to the dimensions of format, expert interaction, interaction with other participants, and the overall process. The results are present below in **Table 11**.

Few of the participants had a positive experience with the internet deliberations. During the feedback, most of them focused on the format rather than on the interactions with the experts. As mentioned in Chapter 3, the format that was adopted by the central organizers was such that only a few participants were "chat active" at a particular time leading to the other participants being passive observers of the "talk".

Table 11: Participants feedback on the internet sessions

	Overall Experience		Experts		Interaction with participants		Format	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Site A	2		1	5	2		1	7
Site B			2	2	2			6

Source: Interview data

With regard to the interaction with experts, the participants were dissatisfied with the lack of responses to many of the questions put by them and with some of the responses given by the experts, in particular, the expert on regulatory issues who believed that the FDA capable with dealing with the emerging regulatory issues. The majority of the comments, however, pertained to the format of the internet deliberations. The interviews also reiterated some of these comments. *"I don't think the experts were that interesting or very well chosen… they didn't have a lot of information for what the groups were focusing on, their concerns for that type of technology."* (Site B participant). The internet interaction was "*..an aspect I was not as pleased*

with as the rest of the process. I am not sure that we all got the answers that we were looking for from the experts…. Some of the experts provided were not as candid as I thought could have been, others on the other hand were extremely candid and forthright" (Site A participant). *"I think often they spoke over our heads …I remember not being impressed by those who came in"* (Site A participant). On the other hand, one of the Site B participants said that his questions were answered by the experts as did another Site A participant. Four of the six interviewees mentioned that the interaction with the participants from the other sites was interesting.

The transcripts of the face to face deliberations do not contain many references to the information from the expert sessions. In the Site A transcripts, I found only one reference made by a participant to the expert information. It pertained to the Jesse Gelsinger case referred to by one of the experts online and was brought up by a participant during a discussion regarding the policing of technology. In the Site B transcripts there was a reference to an expert's remarks about the regulation of technology. There was also a reference to a participant from one of the other NCTF sites.

An important factor for the lack of influence of the expert sessions was that the expert sessions were more like question and answer sessions rather than an interaction between citizens and experts. There was no engagement with the experts' viewpoints. They became a source of information but whether any learning took place cannot be conclusively proved. Davies et al. (2009) argue that dialogue events between citizens and experts that are not linked to the policy process"(…) are spaces enabling individuals from potentially diverse cultures to come together, articulate positions and views, and interact in a context of genuine equality. It could even be argued that this could—theoretically—be a far more effective way of affecting the culture of science to become more personally relevant and democratically accountable than through public

participation in policy" (p.347). These are "sites of *symmetrical individual or small-scale learning*—rather than institutional learning—through *social processes*" (p. 338). The online format of the expert sessions as well as the need to accommodate a large number of participants meant that these sessions were more like question and answer sessions rather than an interaction between experts and participants. Most importantly, the influence of expert interactions on subsequent deliberations and on participants is also an internal process of reflection. It is difficult to capture it with a coding category that is based on only evidence of verbalizing this influence. However, the survey analysis revealed that there was a significant increase in the participants' substantive knowledge of nanotechnology and human enhancements post-deliberation (Hamlett, Guston and Cobb, 2008).

6.3 The Final Reports

The report from the Site A site states the participants' concerns as well as highlights the developments that they would like to see. While the group was enthusiastic about the use of NBIC technologies for repair and regeneration, they had concerns about its use for human enhancement. Their concerns stemmed from their belief that the existing regulatory framework was inadequate and the public may not have access to complete information about the risks and effects of the technologies; some of the applications could have adverse long term effects on health and the environment; and the high cost of these technologies may make them inaccessible to many. During the first face to face session the participants had spent a fair amount of time formulating set of questions that they felt have to be answered before the technologies develop further. The participants were so passionate about these questions that they included them in the final report too.

These questions are-

A. “How will these emerging technologies benefit mankind as a whole – who decides who gets what, for what purpose, and why?
B. How do we ensure that nanotechnologies do not fall into the hands of those who want to control or cause harm?
C. Where is the funding coming from and does the funding give certain rights to the technologies for the funders?
D. How do we ensure that there is a careful analysis of the long-term side effects (i.e. on people, plants, animals and the environment) of these emerging technologies?
E. How will the maintenance of these technologies be developed and deployed?
F. Given the critical nature of regulating these emerging technologies, how do we ensure that a separate governing body with adequate resources and relevant competencies will be established and deployed to implement appropriate policies, guidelines, rules and laws?
G. How do you control the applications of nanotechnologies?
H. What are the marketing strategies for these emerging technologies?
I. Will there be an advisory panel to decide ethical questions and if so who?
J. How can we ensure that the public will receive balanced information on the benefits and risks?”

The Site A report included a set of five recommendations regarding regulation, policing, long term effects, inequality and access to these technologies, and disclosure and information. The report recommends that a new regulatory agency be set up that would be monitored by a civilian board; there should be monitoring of the long term effects on the quality of life and on the environments; developments in nanotechnology should preserve diversity and individual

choice; funding should go to reparative rather than enhancement technologies so as to not increase existing inequalities in society; and lastly complete and unbiased information should be easily accessible to the public regarding developments in the field.

The Site B report also expresses concerns regarding regulation, risks associated with the technology, equitable access to the technologies, full disclosure and unbiased testing. With regard to regulation, the participants were particularly concerned about the lack of a comprehensive policy framework regarding allocation of funding, enforcement of regulations, disclosure of potential risks and benefits, testing and approval of new products using converging technologies, and public education. The final report makes specific recommendations for each of these areas. With regard to allocation of funding, reparative applications should be given priority as compared with enhancement or military applications (the exception being matters of national security), methods should be formulated to increase the say that the public can have with regard to allocation of funds for non-military research, there should be funding earmarked for monitoring and testing and ensuring public and workplace safety and the environment, religious values should be kept out of funding allocation decisions, more disclosure regarding information about government funded products, incentives be provided to companies for developing technologies to clean up pollution arising from human enhancement applications, disease prevention and reparative applications should get priority in funding, and before allocating funding to enhancement applications, more cost effective and lower risk alternatives should be explored. The panel recommended establishing a new oversight body for NBIC applications, imposing high penalties on companies whose applications adversely affect the environment to act as a deterrent, ensuring strict privacy and confidentiality of medical records so that individuals do not face any discrimination from insurance companies or employers, strictly

guarding the privacy of individuals so these technologies cannot be used for surveillance of citizens without due process, full disclosure of information regarding risks to military personnel regarding military applications. With regard to disclosure of information, the report recommends complete disclosure of test results pertaining to public safety, labeling of all nanotech products, and providing information regarding potential risks to workers handling nanomaterials. With regard to testing and approval, the report recommends vigorous testing so as to understand the impact on the environment, high penalties for non-compliance and for polluters, testing to be carried out by neutral experts, and finally, producers of nano-products should be responsible for all the life stages of the product- from extraction to disposal. In addition, testing should be done on artificial or virtual subjects rather than human or animal subjects, and if human testing is unavoidable then participants have to be willing and be provided with complete information regarding long term effects, communities around test facilities should also receive complete information about long term effects and under no circumstances can specific groups or communities be targeted for testing. Lastly, the public has to be educated about the potential benefits and harms involved in employing NBIC-based technologies for human enhancement.

The Site A report made general recommendations in the five main areas of concern- regulation, policing, long term effects, inequality and access, and disclosure and information. The Site B report, on the other hand, made specific recommendation that exhibited a more downstream concern with risk and regulation. The report was worded as a policy document with a specific set of recommendations regarding the allocation of funding, enforcement of regulations, disclosure of potential risks and benefits, testing and approval of new products using converging technologies, and public education. The main facilitator at Site B in the interview had stated that an important task of the facilitator in the NCTF was to help the participants produce a consensus report containing policy recommendations. The need for regulation as well as focus on products that are at the market-stage of

development was also an important concern for the participant who spoke the most at Site B. This did have an effect on the manner in which the report writing at Site B developed keeping in mind the fact that this participant took up one-fourth of the total participant speaking time.

6.4 Concerns

The concerns of the participants were the core of the process. They formed the pivot for the discussion as well as for formulating the set of recommendations contained in the report. The first day of the face to face deliberation started with the participants expressing their initial concerns, excitements and questions regarding the technology. The list of concerns grew as the participants responded to each other and elaborated on the reasons for their concerns. This large pool of concerns was categorized, combined, and prioritized till it was whittled down to a list of five or six "priority concerns". Voting was adopted to prioritize concerns but facilitators at both sites asked the participants to list any concern that they considered important that had not made it to the final report. This list was then fleshed out to form the body of the final report by formulating recommendations for each priority concern. As mentioned in earlier chapters, some of this process of prioritization and writing recommendations took place in small groups in Site A. I coded the transcripts for the type of concerns that were expressed by the participants using the participants' categories. Sections of the transcripts where the participants were reading out the concerns or recommendations either from the whiteboard, computer screen or post-its were not coded.

My initial analysis focused on whether the concerns of the less powerful members differed from those of the more powerful. The concerns were not a static group but changed; new ones emerged as participants heard from others, concurred and disagreed. What I found were differing individual perspectives and viewpoints but not issues that were common to all women

that differed from the issues that were common to men. Viewpoints and worldviews are not independent of group identity and life experience and the latter cannot be disregarded while understanding individual perspectives. I did find different perspectives but not commonalities between all members of the less powerful groups or commonalities between all members of the more powerful groups.

Table 12 lists the initial concerns expressed by the participants at both the sites in response to the query by the facilitators regarding what were their concerns and reaction after reading the background material. This list of initial concerns grew as the conversation moved around the table in response to what others were saying regarding their own concerns. While ethical concerns regarding access, equality and choice were important to many of the participants at Site A, many of the participants at Site B were concerned about the regulatory issues around these technologies.

The analysis of the time spent (measured as lines of text) on discussing various concerns shows that the participants in Site A spent a majority of time (17.35%) discussing ethical concerns like the desirability of enhancements, limits to enhancements, and "playing God" . Regulatory issues followed closely as did issues of cost, access and equity. A theme that ran across the discussion was the issue of personal choice. In Site B, regulatory concerns took up the most time (21.68%) in the total discussion pertaining to concerns, followed by funding and environmental concerns. Of course these categories are rather broad and a number of concerns have been subsumed within each in the analysis.

All the initial concerns expressed by the participants are also reflected in the final reports. The concerns of all participants, including the less powerful, were incorporated in the final

reports largely as a result of the process followed by the facilitators with regard to conducting the deliberations and writing the report.

Table 12: List of Participants initial concerns

SITE A			
Lack of choice Effects of longetivity Playing God Regulation of FDA	Superhumans Who decides Cost	Redefining humanity Cost Regulation Preserving diversity	Access Who decides Loss of technology to radical groups
Testing Ethical considerations	Policing Disclosure Who decides	Who controls	Who decides Choice
Issues of trust Particular groups benefiting	Funding Privacy	Long-term effects Cost	Reliance on technology Inequality due to cost Access to information Safeguards
Playing God Inequality and "classicism"			
SITE B			
Regulation Who decides	Engineered food* Funding	Regulation Corporate control	Cost and Access
Everyday applications	Inadequacy of current regulatory agencies Exaggerated concerns regarding the technology	Military applications Choice	Excessive regulation

Note: Each box represents the initial concerns of a participant
* this concern was subsumed under the broad category of safety and governance while categorizing
Source: Transcripts of deliberations

6.5 Participant Interaction and Engagement

The concept of reflexivity captures the element of listening, reflecting and then incorporating a different viewpoint or changing one's thinking or position on an issue. But this is largely an internal process that is difficult to capture by coding speech. Another measure that can help shed light on the reflexivity of participants is that of participants' interactions with each other. Davies et al. (2006) use back and forth exchanges between two or more speakers as a baseline definition of deliberation. These exchanges can capture "the possibility of disagreement,

conflict and argument, and discussion of that disagreement. Ideally, all this discussion should lead to a possibly, but not necessarily, consensual resolution of or conclusion to the question being explored" (p. 94). Engagement with the views and statements of the other participants is essential to deliberation. "There must also be uptake and engagement-other people must hear or read, internalize and respond-for that public-sphere activity to count as remotely deliberative. Furthermore, for that public-sphere to count as particularly democratic, it must be the case that most people are actively engaged in this sort of give and take with most other people" (Goodin, 2000, p.92). I use the coding categories of reciprocity, agreements and disagreements to capture the aspect of reflection and engagement. Again it is a measure that does not capture the complexity of interaction and learning but it permits us to observe whether participants were engaging with each other and can denote the existence of opportunities for reflection and learning.

The coding category of 'reciprocity' is used to code those statements made by participants that make a reference to another participants statements or refer to another participant by name or elicit others' opinions. In addition, participant responses were also coded as "disagreement" responses and "agreement" responses when they mentioned that they agreed or disagreed with a prior statement made by another participant (these statements may or may not be followed by a reason for disagreeing or agreeing). Taken together, these coding categories provide a measure of whether participants were listening to each other as well as a measure of participants' acknowledging others and including them in the conversation. It is still not a perfect measure as listening and including others is also an internal process. There were individual differences in the number of such statements but as a group these observations formed a fair proportion of the total observations that capture the elements of deliberation. Social talk,

facilitator statements, and questions and responses about the process and topic addressed to the facilitators are excluded from the measure of deliberative talk.

Table 13: Statements of Reciprocity

	ConRes	DisRes	Rec	DelTalk	% of DelTalk
SITE A	101	54	192	1038	33.00%
SITE B	63	49	260	1123	33.21%

ConRes: Statements of agreement
DisRes: Statements of Agreement
Rec: Reciprocity
DelTalk: Deliberative talk
Source: Transcripts of the deliberations

These measures work on a comparative basis for there is no particular threshold figure of reciprocity that characterizes effective deliberation or is a standard for engagement. At both sites, there was a comparable level of engagement with the opinions and viewpoints of others and participants were acknowledging others and including them in the talk.

6.5 Conclusion

There were differences among participants in terms of what concerns and issues were important to each but the facilitators did not disregard any concern. The participants were also respectful of differing viewpoint. The techniques used by the facilitators such as asking every participant to write their concerns and questions ensured that every participant's concerns were discussed. The compilation of the recommendation for the final report was based on the written recommendations of every participant. The final reports, therefore, reflected the concerns and recommendations of every participant. However, as the case from Site B shows the participants' perception of being heard was as important, if not more, as actually being heard. At both sites, there were comparable levels of engagement and interaction with the viewpoints of other

participants indicating that participants were listening to and reflecting upon the perspectives of others.

CHAPTER 7

DISCUSSION

In this chapter, I discuss the main findings of the analysis. The analysis reveals that facilitation and the presence of "expert" and "interested" participants had an impact on the dynamics of deliberation. I discuss these elements in the context of the literature and research on deliberation and public participation. I also discuss the findings with respect to the impact of the ascribed and achieved characteristics of the participants on the deliberative process.

7.1 Facilitation

The literature review revealed that little research has been done on the role of facilitation within participatory exercises. One of these studies is Mansbridge et al.'s (2006) work on facilitators' perceptions of small group deliberations. Their research reveals that the two criteria that facilitators use to evaluate deliberative processes are participant satisfaction and group productivity or maintaining a positive group atmosphere and making progress on the group's task. With regard to inclusive participation in discussions, a common perception of the facilitators was that "all people have something useful to say and it is up to the facilitator to ensure that people use their voice to say it", they "approved when facilitators intervened to make the power of the participants more equal", and some of them found expertise problematic, "unequal expertise, they pointed out, has the potential effect of "excluding those without specialist knowledge"" (p. 26-28). Ryfe (2006, p. 87-88) proposes placing facilitation on a continuum ranging from weak to strong facilitation. "Strong facilitators moderate forums by interjecting themselves into the conversation. They ask leading questions, summarize the

statements of others, and otherwise place themselves at the center of group discussions. In contrast, weak facilitators largely confine themselves to managing the clock and summarizing options discussed by participants". Styles of facilitation vary widely and facilitation is often referred to as an art rather than a science lending itself less to theorizing.

At both Site A and Site B, the facilitators applied a number of different methods to ensure that every participant contributed to the discussion. The facilitators at Site B reiterated many a time that it was the participants' process and report and they had control over defining its scope and content. They were open to including any topic that the participants wanted to talk about and did not put any restriction on what counts for "relevant speech and opinion". They were conscientious about participants taking turns in the order in which hands were raised and did not cut any one off if they were speaking for long. The participants, while setting the ground rules for their discussion, had asked for flexibility with regard to the amount of speaking time. The facilitators also took great care to ensure that the final report reflected the participants' voice and words.

The Site A facilitators also let the participants' control the topics of discussion but their own remarks were often anchored around the scenarios and the background materials. Turn taking, again, was based on raising hands. They also used small group sessions as a way to deal with the slightly larger group in Site A. Some participants may feel more comfortable in smaller groups and may participate more within these spaces. The use of break out groups may have helped the quieter and more reticent participants to contribute.

The facilitators also had different styles. While the lead facilitator at Site B used his training experience and techniques to manage the process, the lead facilitator at Site A used her experience in seminar format classes to facilitate the process, using summary statements after a

topic was discussed and before introducing the next one. Except for a few instances, none of them directly elicited the views of those who spoke less. A major difference in facilitation style was that the Site A facilitators positioned themselves as novices with regard to the topic and defined the process as one of learning for all of them. The Site B facilitators, on the other hand, set aside some time to answer the factual questions formulated by the participants. Both group of facilitators used voting as a way to identify priority concerns and twice the Site B facilitators used voting to resolve disagreements with regard to wordings to the report. As detailed in Chapter 6, the system of voting used in the online and the face to face deliberations lead to an alienation of the minority participant.

The analysis of the transcripts also reveals that there is limited time available for the deliberations to unfold and explore different perspectives. The imperative of producing the final report as well as the limited time available for deliberations did not allow for issues to be probed and conflicts explored. The need to maintain civility also constrained interaction. The need for civility or, as mentioned by one of the participants, the fact that "*everybody has got their good face on"* may have constrained a true expression of one's viewpoint.

I discuss the facilitation in detail using Mansbridge et al.'s study (2006) on facilitation which is one of the very few that looks at this aspect of deliberation. Based on the observations of facilitators of small group deliberations, the authors derive certain norms of deliberation. The two standards by which facilitators judge deliberative processes are: *positive group atmosphere* and *making progress on the task*. These two standards are directly related to two important goals of deliberation-*group satisfaction* and *group productivity*. The elements of a positive group atmosphere are- humor, lightness while maintaining a sense of importance, admissions of fallibility, and emphasizing the civic importance of deliberation. Some of the elements of

making progress on the tasks as identified by the facilitators were- giving clear instructions and stating the goals clearly, using time wisely, allowing time for self-reflection, posting and recording information, clarifying questions by facilitators and participants. In addition, the facilitators' comments provided insights into certain aspects of deliberative theory- use of reason and emotion, common good versus common ground, free flow of talk, and equality. With regard to equality, the facilitators emphasized extensive and inclusive participation in discussion, self facilitation, and fair representation of views. The major criteria by which they judged these three aspects of equality are presented below.

A. Extensive and inclusive participation in discussion:
    1. All participants are included
    2. Free flowing interaction
    3. Respect for others
B. Self facilitation
    1. Limited exercise of facilitator power
    2. Free flowing interaction
C. Fair representation of views
    1. Equality of participation
    2. Diversity of views
    3. Minimal intervention from the facilitator

I use these three standards of equality along with the goals of group satisfaction and group productivity to evaluate the role of facilitation and to examine the relationship between facilitation and inclusion within the Site A and Site B NCTF.

7.1.1 Group satisfaction

With regard to positive atmosphere and participant satisfaction, the facilitators at both the sites created an atmosphere that made participants comfortable. The participants' perceptions are the best measure for this standard. In their interviews, participants from both the sites credited the facilitators for creating a positive and open atmosphere. "*It was an open forum - we could laugh with each other and talk about our experiences" (Site A). "They made it clear what our goal was" (Site A). "They made sure everyone was heard" (Site A).*

The Site B transcripts also provide some indicators of the participants' perceptions of the facilitators. The following comment was made by a participant at the end of the first face to face weekend that demonstrate that she felt included and valued."*I think you did a good job making every voice feel honored and important. I really loved the way you all took note. I mean you guys were tedious with those note taking and I am accustomed to people taking notes and like you can literally see them hesitate like am I going to take this or that is not really important and so like I personally felt very validated during this process and that was great and then I also want to commend you know the group members you guys we did a great job of being really cohesive and supportive and empowering of each other so it was not an honor, it was a privilege and it felt really good to be here so I am excited about that."* The facilitators at both the sites emphasized the goals of the project and the importance of the participants' involvement in the project. During the introductory session, both participant spent time not only describing the project but also emphasizing the role of public participation. The interaction between the participants was cordial and respectful and gravitas was balanced with humor. The participants could laugh with each other.

7.1.2 Group productivity

With regard to group productivity, the facilitators at both the sites emphasized the goals of the project and the need to formulate a final report based on consensus that contains a set of policy recommendations by the end of the final day of the project. Both sets of facilitators typed the major points and notes on each day's discussions that were emailed to the participants by the end of the day. In addition, during the deliberations both sets of facilitators asked a number of clarifying question so as to understand the participants' viewpoints. These also helped to clarify them to the group. The facilitators at both sites did ensure that the group was on track with regard to the report writing by moving the discussions along and both groups had written their final report by the conclusion of the last face to face weekend.

7.1.3 Extensive and Inclusive deliberation

With regard to the normative goal of extensive and inclusive deliberation the facilitators did not fare well on the standard regarding equality of participation. As described in Chapter 5, the deliberations at both the sites were characterized by inequality in speaking time. There were participants at both sites who monopolized speaking time. The facilitators did not solicit the views of the quieter participants except in one or two instances and their interventions to elicit participants views were general rather than targeted in nature. They were addressed to the group rather than the quieter participants who were contributing less. The facilitators organized participants' turns to speak on the basis of raising hands and they were meticulous in keeping a record of the order in which hands were raised. As a result, many participants spoke as much as they wanted leading to an increase in the probability of influencing deliberations based on their domination of the total speaking time of the participants. Time spent on talking about particular concerns is directly correlated with the speaking time of each participant. For instance, one of the

Site B participants spoke for nearly a quarter of all speaking time of the participants. During one the of internet sessions, the moderator asked, "*We've had a number of technical questions and questions of policy priorities, etc. Are there ethical questions that you want experts to address?*" In response, the Site B participant wrote "*I tend to feel the technical & policy Qs are more important. The both tend to encompass ethical issues*". These were the types of questions that were predominantly discussed within the group at Site B and are reflected in the final report.

In order to examine the free flowing interaction, I looked at the results of the coding categories for facilitator statements- interjections, summary statements, and interventions in order to understand whether or not facilitators placed themselves within the deliberative talk and the pattern of interaction between the participants and the facilitators. The choice by the facilitators in Site B to answer factual questions regarding nanotechnology placed the facilitators within the deliberation. This question and answer session on the first day of the deliberations between the facilitators and the participants was a one-way interaction that fulfilled the information-searching requirement of the participants but did not contribute to any interaction between the participants. Even later in the course of the deliberations, many of the participants would address a question regarding the topic to the facilitator. Questions on the process as well as regarding expectations from the participants were common at both Site A and Site B but these played a role in clarifying the role of the participants; the questions on the topic that were answered by the facilitators, on the other hand, placed the facilitators within the deliberative talk giving them had the opportunity to influence the process by becoming part of it. The questions that were answered by the Site B facilitators during the first day of the face to face interactions are:

1. Where is nanotechnology right now

2. What does nanotechnology exactly involve
3. Nanomaterials in sunscreen
4. Cloning animals and xenotransplantation
5. Use of nanomaterials in manufacturing-properties of nanotubes, nanofibers, nanosilver
6. Targeted delivery of medicine
7. Potential negative effects of nanotechnology
8. Potential toxicity
9. Regulatory agencies
10. Funding of nanotechnology
11. Other applications: use of nanomaterials for sensors to detect small changes in the environments, as biomarkers; nanotechnology for solar cells, cleaning groundwater.

The facilitators in Site B also started the process of report writing earlier leaving little time for free flowing talk between the participants. In addition, the main facilitator at Site B who lead the majority of the discussion, interjected often in the discussion and his frequent interjections lead to exchanges between him and the participant rather than between participants.

With regard to respectful deliberation, the participants treated differing viewpoints with respect and often used clarifying questions to understand differing viewpoints. As shown in the excerpt in Chapter 6, the participants did negotiate differences and attempted to solve disagreements on their own.

The Site A facilitators interjected less in the interaction between the participants. The interactions can be broken up into a number of smaller exchanges between participants followed

by a summarizing statement by the facilitator. Both the facilitators also used more clarifying questions and probes to understand the reasons and values underlying the concerns.

7.1.4 Self-facilitation

The participants at both the sites did not censure any topic or manner of argumentation. The lead facilitator at Site B emphasized this many a time during the course of the deliberations. Participants could bring up any issue that concerned them. The facilitators at Site A based their introductory statements on the background materials and made more references to the materials as compared with the Site B facilitators. With regard to the participants' power over the process, the Site B facilitators let the participants set their own ground rules for managing the discussion while the Site A participants were given the ground rules by the facilitators. The format of the process, however, was controlled by the facilitators at both the sites. The Site B participants also questioned the framing of the background materials. Two of the participants were very concerned about the everyday applications of NBIC technologies rather than the "futuristic" vision embodied in the background materials and did focus their arguments around these everyday applications.

7.1.5 Fair representation of views

The fair representation of views was impeded on account of the inequality in speaking time. Diverse viewpoints were expressed and the facilitators did not restrict any concern from being included in the discussion but there were differences between facilitators regarding the amount of intervention in the process. The amount of interventions also varied with the task of the group. The maximum facilitator interventions occurred on the last day of the deliberations

during the report writing part of the process. In the view of one of the facilitators, the need for consensus may have an impact on the fairness of the process. "*The fact you are working towards a consensus is an important conditioning thing. Because you are not actively looking to expand the range of opinions, you are looking to get everyone to focus down on a few sets of things they agree upon"*. Similarly, the time constraint also acts to limit how much the facilitator can help to unravel concerns. The discussions and disagreements on the last day of the deliberations were often concluded early and the participants moved on to the next topic or concern without exploring all the issues involved. For one of the Site B facilitators, the consensus report was the biggest challenge of the process. The biggest challenge was "*getting the consensus document out-actually hammering out the language- so that all points and views were represented*".

The manner in which the consensus report was written also differed in the two sites depending on the approach adopted by the facilitator. In Site A, small groups worked on their priority area of concern and wrote a recommendation on it. There were five priority areas with a recommendation on each that formed the final report. There were two levels at which this was discussed-within the smaller group and then by the whole group. By the time of the larger group discussion, at least two or three of the smaller group members had reached a consensus on each recommendation. These were discussed and clarified and then written in the final report. In Site B, the priority concerns were identified and then each participant wrote recommendations on one or more area of concern based on their list of priority concerns. All the recommendations on each area of priority concern were then compiled and discussed during report writing. As a result, there was more to negotiate during the report writing stage in Site B that at Site A. The difference in the approach is reflected in the form of the two reports. The Site A report is more general in its recommendations, with a limited number of recommendations all of which

underscore the importance of personal choice while the Site B report contains a large number of very specific recommendations.

7.2. The presence of expert and interested participants

The presence of experts or those with specialized knowledge is viewed as undesirable within participatory processes such as consensus conferences for it leads to "asymmetries of information" between participants. Similarly, participants should be "disinterested" as the presence of participants with strong interests can distort the deliberation process. The definition of disinterested varies in usage, some defining it as "the *absence* of specialist expertise that marks disinterestedness'; it is the lack of any prior, or special, interest in what the experts know and care about" (Evans and Plows, 2007, p.829) while others define it as the lack of a stake in the topic.

Within the Site A NCTF, the "expert" participant with knowledge of the field of nanotechnology spoke the most and was listened to. One of the participants in the interview answered the question –did any participant dominate the discussion-with, "*Yes and no. We encouraged him because he had the knowledge. His position because of his knowledge and his background was something that we were interested in*". The other participants perceived his views to be valuable and expected him to contribute more to the discussion. He was also the "spokesperson" for his break out groups; whenever the small groups reconvened as part of the larger group he spoke on behalf of his group. As posited by the expectations status theory, the other participants drew upon information such as status, education, and knowledge to generate expectations about him which in turn effected his participation and influence over the group tasks. Shelly and Webster (1997) also add "patterns of liking and disliking" to status as a feature

that can structure interaction. The "likeability" of a person can also create hierarchies within a group as a likeable person is again provided with more opportunities to be heard. Van Stokkom (2005) has also included the occurrence of charisma as a factor that impacts deliberative group dynamics. "The competence of a charismatic person therefore relies on an ability to assess which ideas are attractive at a particular point and which ideas have a chance of success, rather than on the ability to exploit specific or unique knowledge" (p. 395). Personality traits, in addition to perceived expertise, add to the messy nature of group interaction.

One of the Site B participants commenting on the diversity within the group stated, "*There were not people with enough things in common to form alliances- there was one of everything. The social relationships that we had with each other is not like when people are thrown on a lifeboat on a desert island because that is a difficult dynamics, more like when you meet a bunch of strangers at a party, everybody has got their good face on and you don't know anything bad about them and you are not there long enough together where you can't stand someone. That was good the way it was set up. We were working toward a common goal and there wasn't time and inclination to bring things that you didn't like about people. That was a good thing and that had a lot to do with the two facilitators. They kept it flowing and they kept it from occurring*". She viewed the facilitation as important in managing the differences as well as implied that the format and time constraints did not encourage the development of relations of "likeability" to develop that has been identified by Shelly and Webster (1997) as a factor that explains the development of hierarchies within groups. Kleinman et al. (2011) in their comparison of two consensus conferences held in Madison, Wisconsin state that,

> a well-facilitated process in which participants have prior perspectives (although not clear instrumental interests) on the issues at stake might still produce a fair and reasonable

> outcome. If this is the case, the possible exclusion of some of the consensus conference panelists on the basis that they did not meet the rigorous and self-conscious application tenets of deliberative democratic theory concerning prior instrumental interests might be needless (p.235).

In the case of the Site A and Site B NCTF, even excluding the participant with an "instrumental interest" (based on employment or financial stake in nanotechnology as defined in the applicant survey) in nanotechnology, most of the other participants did not have amorphous, unformed opinions but had strong, defined views about the capability of regulatory agencies, trust in government, the healthcare system, the importance of equitable access, the role of personal choice, control over technology etc. These positions acted as anchors for interaction between participants and contributed to the diversity of viewpoints within the group. The "interested" participants in Site A also kept in touch after the NCTF by email. In the interviews, two of the participants mentioned that some of the members were still in touch through email with a couple of them emailing articles and information that they thought others would find interesting. This effort was spear-headed by the "expert" participants. Interest in the topic is of importance for public participation as it can sustain engagement.

The only participant who had firsthand experience of human repair/regenerative technology brought a perspective to the Site B group that was valuable; more so on account of the one-sided interaction with the experts during the internet sessions. These sessions were in the form of a question and answer session rather than a dialogue between experts and participants with little opportunity for any social or reflexive learning on the part of either participants or experts. The pro-technology position held by the participant provided a perspective that was richer than what was contained in the background materials because it was also a way by which

the participants could actually visualize the information contained in the materials. Davies et al. (2006) in their study of the citizens councils set up by U.K.'s National Institute of Clinical Excellence find that "interactive and positioned experts", that is those experts who present strong for-or-against positions and engage in back-and-forth interactions with the participants improve the quality of deliberation as well as its effectiveness. In the absence of such interaction, participants who advocated particular positions helped the others engage with the topic.

7.3. Status characteristics of Participants

The analysis did not reveal any substantial effects of ascribed and achieved characteristics on deliberation. One of the reasons is the small size of the two groups (13 in Site A and 9 in Site B). Another factor was the existence of status inconsistency. The group identity lines shift on account of these inconsistencies. The status expectations theory posits that the context as well as the nature of the task determines the saliency of the status characteristic. In the context of the NCTF deliberation, scientific training or expertise should be a salient characteristic. However, as the analysis revealed, in the case of Site A, the participant who was female, minority with a science background did not contribute to the deliberations in the same manner as the white, male, scientist. On the other hand, in the case of Site B, the participant who dominated the discussion was female, minority whose job experience provided her with knowledge about the policy process and the regulatory framework. In both sites, job experience was a predictor of voice rather than other status characteristics such as gender and race. At both the sites, the two participants who spoke the most made references to their jobs and the relevant experience it provided; the participant at Site A more than the one at Site B.

However, there were certain noticeable differences within the Site A group that point to future directions of research as well as support findings in other research. The Site A group was more evenly balanced than the Site B group in gender and race composition. There were clear differences in the speaking time of the white participants as compared with the black participants. An important observation was the emergence of a few dominating participants at each site that lead to an imbalance between participants. The inconclusive findings do not imply that ascribed and achieved status does not matter within group deliberation. The asymmetries created within the group were also based on the expectation that participants had of each other with reference to their status. A more powerful explanatory variable is interest. All the participants who spoke more had certain interests or views that they strongly believed in. They differed with regard to the deliberative capital they brought to their reasoning but it was their strong views that led to their increased contribution to the discussion. The disinterested participant remains disengaged and even the most effective facilitator may not be able to include them within the process.

Another important finding was that not only should minority views be heard but the holder of the minority views should perceive them to be heard. The participants' perception of the process is the most important indicator of group satisfaction. As detailed in the case of the minority opinion in Site B, the participant felt that his opinions were not being heard as the system of voting was effectively excluding marginal opinions and voices or was putting them last in the list of priorities. The perception of fairness is as important if not more as the enactment of fairness and facilitation has to be sensitive to this aspect of group dynamics.

CHAPTER 8

CONCLUSIONS AND POLICY IMPLICATIONS

The primary research question that guided my research is whether the deliberations within the NCTF at Site A and Site B were inclusive. The motivation behind the "participatory turn" in science and technology policy is to redraw the boundaries between experts and laypersons so as to include ordinary citizens within the policy process. This process of inclusion provides a different perspective to problem solving and decision making under conditions of uncertainty and incomplete information. Defining inclusion in terms of presence, voice and being heard, my analysis focused on the social interaction between participants, facilitators and experts to see whether the rules of engagement and achieved and ascribed status differences between participants had an impact on how inclusive the process was.

8.1 Hypotheses and Findings

This sections details the findings with reference to the hypotheses that guided the research and analysis.

A. Inclusion measured by Presence:

H. 1.1: *The rules of engagement pertaining to recruitment will lead to the presence of a diversity of participants*

The NCTF protocol and attention to the recruitment strategy resulted in a diverse group of participants at both the sites in terms of demographics and viewpoints. Diversity in terms of political affiliation, however, was not present at Site B. The aim of the recruitment strategy was to recruit "average, non-expert" citizens. At both sites, there

were participants who had professional backgrounds in research that put them on a more comfortable footing in the discussion. Their presence affected the internal dynamics of the group and had an impact on the democratic quality of the discussion.

B. Inclusion measured by Voice:

(i) Status

H 2.1: *The facilitators will have to intervene more to get the less powerful members to introduce claims in the face to face deliberations.*

The analysis found a clear inequality in speaking time at both sites and almost no intervention by the facilitators to equalize speaking. White participants spoke more than black or Asian ones at one site, and women (one woman in particular) spoke more than men at the other site, except for the last day of the deliberations.

At Site A, with regard to the total participant speaking time; three participants contributed to nearly 50% of the speaking time while the three participants who spoke the least accounted for a little over 7% of the time. The white participants took up much more of the speaking time than the black and Asian participants. In Site B, two of the participants contribute to 42% of the total participant speaking time with the top speaker taking up a quarter of the total participant speaking time. Consistently women spoke, on an average, more than men on all days except the last day.

The analysis did not find sufficient evidence to support the claim that the facilitators at both sites intervened to get the less powerful members of the group to contribute to the discussions. In fact, the analysis of the transcripts reveals that

there were only a couple of instances when the facilitator called upon a participant eliciting their views with regard to the topic being discussed.

Another source of data that was used to determine whether participants felt included was the survey and interview data. In the survey questionnaire, the majority of the participants strongly agreed or agreed with the statement that the recommendations contained in the final report accurately represented their individual preferences There were no participants who disagreed with the statement and only one participant at each site was neutral about the statement. All six participants who were interviewed stated that they were provided with sufficient opportunities to speak and all felt that their views were heard by the other participants.

H 2.2: *The less powerful members will contribute less to the internet deliberations.*

This was not the case. Some members of less powerful groups contributed larger percentages to the internet deliberations in terms of "speaking time". There were individual preferences at play rather than any group effect. The "speaking time" of the participants during the internet sessions was controlled more strictly by the moderators and as such, participants could not freely introduce claims or speak as compared with the face to face deliberations. Individual differences between the speaking times online and face to face are striking in the case of a few of the participants. In many cases, the character of online synchronous communication as well as the structure of the online sessions was the reason for limited participation.

There were individual preferences at play rather than any group effect that accounted for differences. And I could not find conclusive evidence of my hypotheses that the less powerful members will contribute less to the internet sessions due to the lack of active facilitation that is sensitive to the differences in participation rates.

H 3.3: *The less powerful members will use more narratives and personal experience statements than the more powerful members.*

The analysis of the transcripts revealed that, in general, reasoned argumentation was much more common in deliberative talk at both sites than the use of narratives. At both Site A and Site B, reasoned utterances were more common than narratives and stories. There were, however, differences in the use of narratives in both sites. In Site A, women used more narratives than men. And narratives were used less in deliberation by the Site B participants as compared with the participants in Site A.

(ii) Expertise

H 4.1: *Participants perceived as experts, that is, as having specialized knowledge of the field, will speak more than those perceived to be non-experts.*

The analysis of the transcripts revealed that participants who were perceived by the groups as experts did speak more than the non-experts. The participants in their interview stated that some participants dominated the discussions but most did not consider it as an unusual occurrence. Dominance was considered natural and not as an occurrence that had a negative effect on the deliberation process.

At Site A, two of the participants had research backgrounds in areas that have a close connection with the topic. One of them clearly spoke more than the other participants. In the case of the second participant, her speaking time was much less than many participants and decreased over time. A difference between these two participants was that the former claimed to have specialized knowledge while the latter made no such claim in her talk. At Site B, none of the participants had specialized expertise in the sciences but there was a participant who on account of a body implant had experiential expertise. She espoused a strong pro-technology position based on the positive effects on her quality of life due to the implant. Her speaking time was the second highest for all participants in Site B. The participant who spoke the most in Site B could also be characterized as having specialized knowledge of an area of work that is known to be impacted by NBIC developments.

The analysis revealed that participants' expertise and professional attachments were closely related to their speaking time. These participants with the different forms of expertise were ones that the recruitment strategy aims to exclude- those with specialist knowledge and those with strong positions on the premise that their presence can distort deliberation. But these "interested" participants enriched the discussion by being a source of information. The pro-technology viewpoint, for instance, was a perspective that the participants could question and engage with and learn from.

H 4.2: *Participants perceived as experts, that is, as having specialized knowledge of the field, will be interrupted less than those perceived to be non-experts.*

In general, regardless of whether the speaker was an expert or non-expert, there were no instances when a participant interrupted another mid-stream and took over the conversation. Both the facilitators and the participants in their interviews mentioned that the participants were respectful toward one another. At both sites, the deliberations were characterized by civility and a respectful consideration of views.

H 4.3: *In cases of status inconsistency, the achieved credentials (perceived ability) of participants will outweigh their ascribed characteristics.*

In one group, a white male former researcher occupied a rising percentage of speaking time, while a black female graduate student in the sciences occupied a falling percentage. In this case, ascribed characteristics seemed to outweigh expertise. On the other hand, in the other group, an Asian woman policy researcher's speaking time was the highest for her group.

The analysis did not reveal any substantial effects of ascribed characteristics on deliberation. One of the reasons is the small size of the two groups. Another factor was the existence of status inconsistency. The group identity lines shift on account of these inconsistencies. However, there were certain noticeable differences within the Site A group that point to future directions of research as well as support findings in other research. While the Site A group was more evenly balanced than the Site B group in gender and race composition; there were clear differences in the speaking time of the white participants as compared with the black participants.

But the lack of a conclusive finding does not imply that achieved and ascribed status does not matter within group deliberation. An important observation was the emergence of a few dominating participants at each site that lead to an imbalance between participants in terms of voice. “Experts” were provided more space by the other participants to express their views. The analysis revealed that a strong explanatory variable is “interest”. All the participants who spoke more had certain interests pertaining to the topic or views that they strongly believed in. Their strong views led to more contributions to the discussion while the disinterested participant remained disengaged.

(iii) Facilitation

H 5.1: *The more experienced facilitators will be able to better ensure equality of speaking time.*

The experience of the facilitator had no role to play in ensuring equality of speaking time. With regard to speaking time, the facilitators let the participants’ control how much each contributed to the deliberations. They did not intervene to ensure equality of speaking time.

H 5.2: *The more experienced facilitators will include more participants in the discussion.*

The analysis did not find any evidence that the more experienced facilitators included more participants in the discussion. The instances when any facilitator elicited the specific viewpoint of a particular participant were rare. The facilitators did not intervene directly to get those who spoke less to contribute to the discussion.

C. Inclusion measured by Being Heard

(i) Status

H 6.1: *The claims and concerns of the less powerful members will be debated less than those of the more powerful members if they differ from those of the more powerful members.*

Time that was spent discussing particular concerns was directly correlated with a participant's total speaking time. Whether they were the same or different from those of the powerful members was irrelevant to the time they received in discussion.

In order to understand this relationship, I focused on understanding how minority (as in numerical minority) viewpoints were accommodated in the process. Participants, while dealing with this situation, were considerate of differing opinions, attempted to understand those differences, and worked collaboratively to come to a decision that was acceptable to all. Most importantly, the analysis revealed the importance of the perception of the less powerful members regarding their views being heard.

H 6.2: *The final recommendations will reflect more the concerns of the powerful members.*

The final reports of both sites contain the concerns of all the members of the group. The collaborative manner in which the final reports were written did lead to each participant's concerns being included. The concerns were not a static group but changed and new ones emerged as participants heard from others, and concurred or disagreed with those views. Diverse as well as common perspectives

were present within the groups at both sites but I did not find commonalities between all members of the less powerful groups or commonalities between all members of the more powerful groups.

(ii) Expertise

H 7.1: *The information provided by the experts during the internet sessions will form a predominant part of the second face to face session.*

The transcripts of the face to face deliberations contain very few references to the information provided by the experts, just one reference at each site. In their feedback of the internet sessions, most of the participants focused on the format rather than on the interactions with the experts. The transcripts of the face to face deliberations also do not contain many references to the information provided by the experts.

8.2 Was the NCTF inclusive?

Three broad research questions guided this research with the most important one being whether the NCTF process was inclusive.

1. How do ascribed and achieved characteristics such as gender, race, education, income, and expertise affect the deliberative exercise?

   The analysis did not reveal any substantial effects of ascribed characteristics on deliberation. Expertise was the variable of interest that contributed to the asymmetries in contributions.

2. How does the format affect the deliberative process? Did the NCTF create conditions which promoted open and inclusive dialogue?

    Two of the most important elements in the format of the NCTF that adversely affected inclusive dialogue were the structure of the internet sessions and the failure of facilitation in drawing out the quieter participants and ensuring a broad parity in speaking time.

3. Was the process inclusive?

    Inclusion requires equality. I am not arguing for a strict equality in the contribution that each individual makes to the deliberations but am arguing for a broad parity in speaking time of the different participants.

    In terms of external inclusion, the recruitment strategy for the NCTF contained certain criteria to exclude those who had a financial or professional stake in nanotechnology keeping in view its goals of involving lay citizens in deliberations about nanotechnology and human enhancement. Despite these criteria, one of the participants was a research scientist who did have expertise pertaining to nanotechnology. But as emerging technologies develop, their inter-disciplinary character will mean that many who work in STEM fields will have knowledge about these technologies that can be characterized as specialized in comparison with the knowledge of "average" citizens. In addition, though the internet component was an important design element in scaling up deliberations to a national level it also excluded those individuals from participating who did not have access to the internet during the late evening hours.

    In terms of internal inclusion, the participants varied in the amount of speaking time. As stated earlier, equality in deliberation does not mean that every participant

speaks the same amount but the amount of speaking time provides an indication of dominance of the discussion by a few as well as the non-expression of views by those who barely spoke. In this regard, both the sites were characterized by an inequality of speaking time. In Site B, the top two speakers spoke for 42% of the total participant speaking time while in Site A, the top two speakers accounted for 37% of the total speaking time.

Though the facilitators were unable to ensure a broad equality in the amount of speaking time they were more successful in ensuring that what was voiced by the participants was included in the discussion. They were open to including any concern expressed by participants even if it was not directly related to the topic of enhancement. Respectful consideration of others' viewpoints was stressed at both sites and the facilitators were particular about observing the order of show of hands for turn taking. The participants also engaged with others, the deliberations were open and respectful, and the interview as well as survey data reveals that the participants felt included and were satisfied with the process and the output.

In the final analysis, a broad equality in the distribution of speaking time is important because when there are participants who barely speak then there is a missing perspective that remains unvoiced and absent. In Site A, six participants each spoke for less than 5% of the total participant speaking time; out of these three were minority women and two were minority men. In Site B, the average speaking time was greater than at Site A largely due to the small size of the group and of the four participants who each spoke for less than 10% of the total participant speaking time, two were minority

women. Inclusion would have been better served if the facilitators had been able to draw out these perspectives.

8.3 Limitations and directions for future research

Like all studies, there are certain drawbacks to this research. The causality between status, equality of speaking time, time spent discussing concerns and domination cannot be established due to the small size of the group and the presence of factors that cannot be controlled such as the context of the participation. The same factors account for the difficulty in generalizing from these cases. But the very nature of the research problem- understanding inclusion within small face to face deliberative processes- necessitates this research design. This is a qualitative study that focused on the interaction between a small number of individuals within a particular context. The purpose of the study was to understand the process of inclusion or exclusion that occurs within this small group context. However, the conclusions drawn can point to future directions of research and do provide important insights into the design of participatory processes.

The relationship of experts and the public is central to the debates regarding the democratization of science. An important feature in these debates is a call to increase public participation in decision making around S&T issues. The debate also calls for carving a role for the public at the initial stage of setting research and funding priorities of the innovation process rather than only at the stage of regulation and management of impacts. The involvement of the public is advocated on the grounds that it will broaden the perspectives involved; allow the inclusion of societal goals in the process of innovation and technology development; and increase the legitimacy of decision making. As these public participation processes proliferate so

has research evaluating their process and impact. Studies that focus on the interaction between participants, the deliberative talk, and the rules of engagement, however, are still rare.

A main finding of my research is that facilitation is a process that shapes and influences the process and output of public participatory processes. This facet of deliberation has remained largely unexplored. Facilitators perform a tough balancing act reconciling equality with inclusion, the constraint of consensus with the importance of unpacking opinions to discover common ground. This also provides the facilitators with power over the process. For instance, by calling on less powerful participants the facilitators can create equal spaces for all participants; certain topics can be deemed as outside the scope of deliberation; or even certain forms of discourse can be disallowed. The design of participatory processes as well as research on these processes has to take into account facilitation influence.

Within the Site A NCTF, the presence of an "expert" participant became both a cause of domination as well as an opportunity for learning. The experiential expertise of a Site B participant again added value to the process for it gave voice to a different perspective adding to the diversity of perspectives and was also an opportunity for learning. This was also due to the fact that the expert interaction component of the NCTF was structured as a question and answer session. Similar to the way experts with strong positions can enhance reflection as well as the manner in which participants engage with the topic, the presence of "interested" participants can enhance learning if managed effectively by facilitation.

Future research that focuses on how facilitation frames deliberation will provide useful insight into how deliberation is structured and will contribute to the broader field of deliberative democracy. In addition, while this research has focused on the process of deliberation it is important to also link it to its impact especially in the area of science and technology policy

where citizen participation is advocated as a method of governance that can result in responsible innovation and a socially robust science. In a 1999 article, Joss asked, "*We may then further ask what public participation actually amounts to. Is it no more than an ephemeral phenomenon that, not unlike a fashion, may grab the public's attention for a while before disappearing again as quickly as it emerged? Or does it, in contrast, represent a profound, paradigmatic transformation of science and technology public policy- and decision making? As of now, the jury is still out on this.*" (p. 293). Thirteen years later, these words still ring true. Public participation is here to stay but what have been its results? Further research has to look at whether participatory methods have brought about any changes in the nature of science and technology policy making and what has been the quality of these changes.

8.4 Recommendations for Changes in Process

The analysis of the deliberative talk within the NCTF revealed that group dynamics can distort deliberation within participatory exercise such as the consensus conference. However, these distortions are manageable and can be remedied through certain process modifications.

1. Facilitators require special training to make them cognizant of the importance of equality and inclusion in deliberation including the importance of equalizing speaking time and to equip them with the skills to handle differences in ascribed and achieved characteristics of the participants.

2. "Expert" citizens will be a part of deliberative exercises largely through self-selection. The design of these exercises should be modified to accommodate this fact rather than designing on the basis of a theoretical ideal. Again, training of facilitators can help in

equalizing any power imbalances between participants that may emerge on account of their presence.

3. Participants should be able to interact and engage with experts. This interaction should be face to face as far as possible but if scaling up deliberations needs an internet component then the electronic interface should permit interaction rather than one-sided exchange of information.

8.5 Policy Implications

The analysis of the NCTF provided insights with regard to the factors that can influence deliberative talk and the process changes that can mitigate the distorting effects of this influence. But it also raises certain broader issues regarding the match between the participative form and its purpose, between its goals and impact, and its match to the political culture within which it functions.

1. Are consensus conferences the best model for citizen participation in science and technology policy making?

   Despite a growing body of research on consensus conferences, the effectiveness of consensus conferences still remains a matter of debate. "The fact is that the efficacy of public participation remains largely a matter of faith and of what model of society and citizenship one is committed to" (Rayner, 2003, p.168). Though the first part of this sentence is contentious, there is little to argue with in regard to the latter part. A major problem with participative exercises such as the consensus conference is that their rationale and goals are often unclear. Stirling (2008) drawing on the work and terminology of Fiorino (1990) identifies three rationales for public participation:

instrumental, substantive and normative. Public participation driven by the instrumental rationale aims to achieve a particular end such as restoring trust in expertise; the substantive rationale justifies public participation on the grounds that it will lead to better policy making; while the normative rationale sees public participation as the right thing to do. Most of these participatory exercises like the NCTF are "invited spaces" (Wynne, 2007) rather than citizen-led initiatives. These invited spaces often constrain participation by defining who should be a participant and the manner in which they should participate. Rather than opening up to alternative framings of the issue these forums can constrain them (Delgado et al., 2011). The analysis of the NCTF shows that consensus conferences involve a heavily designed and carefully orchestrated deliberation. Not just organizers but facilitators can potentially impose their framings on to the deliberations and the recommendations.

In addition, the requirement to produce a final report or a set of recommendations that reflect the voice of "the public" can act to counteract the expectation that public participation will add a qualitatively different voice to the debate around emerging technologies. The latter requires a more dynamic conception of the public. Opinions, knowledge, politics and science are always evolving, coalescing and diverging. This cannot just be captured by "one public" or by a pristine consensus that masks the reality of differences in values, interests and knowledge. As argued by Stirling, (2008), the 'closing down' of deliberations is fraught with problems that raise issues about the legitimacy and accountability of the participative procedure. A different group of participants or a different format may have produced a different set of recommendations. Instead he argues for methods that result in plural and conditional recommendation, that

is, they produce “a range of potentially justifiable actions” each of which “is qualified by associated values, assumptions or contexts” (Stirling, 2010, pg.27).

If the goal of public participation is to explore alternative pathways of technology development then consensus conferences with the requirement of a consensus report are not the right model. The model may fit better when the goal of the deliberations is to arrive at a decision or arrive at a set of consensus based recommendations that will be taken up for discussion by the policy-making body. However, in these cases the fundamental questions of accountability and legitimacy of participatory exercises have to be addressed and may become even more important. Before undertaking any participatory exercise, the organizers of these invited spaces have to clearly define their goals as well as the rationale for conducting the exercise. These should then be matched to the right model from the growing repertoire of participatory exercises.

2. How should these participatory exercises be embedded in the science and technology policy process?

Douglas (2005) points out that the citizen participation in technological assessment can help frame the problem better; they can provide valuable information about local conditions, knowledge, and practices; and of the values that should shape the analysis as well as the technology. If the rationale for public participation in science and technology policy is to impact the direction of science and technology policy to make it more socially robust, equitable and reflexive, then the numerous participatory exercises have to be a part of the policy process either formally or be able to influence the policy process. These participatory exercises cannot function in a vacuum or as eternal proofs of concept demonstrating the feasibility of public participation in policy making. Goodin

and Dryzek (2006) have pointed out that an important conundrum in participatory democracy is how to ensure "the macropolitical uptake of minipublics". In the US, the problem is compounded by the fact that ever since the demise of the Office of Technology Assessment (OTA), a direct link between public participation in science and technology issues and the policy making bodies has not been established. Most of the organizers of public participation exercises are non-profits, universities or foundations. In such a scenario, advocates or "policy entrepreneurs" are needed who can find effective channels to take up the results or recommendations of participatory exercises to policy makers or to integrate it within the larger public debate. However, the lasting solution to this problem lies in clarifying the relationship of public participation to representative democracy.

Dryzek (2010) argues that the political setting within which public participation occurs is of prime importance in determining their potential and impact. The US is defined as a "passively inclusive state"; these states "provide a number of channels by which the interests grounded in civil society and the market can exercise influence (lobbying, legal action, consultation, political party activism), but otherwise do not intervene to affect the pattern of interest organization in civil society, or organize groups into the state" (pg 171). A mini-public in a passively inclusive state will have differing effects than one organized in an actively inclusive state such as Denmark. Mini-publics in such states will not be able to actually make policy but they will be able to inform public debate and build citizen capacity. If that is the case, then as stated earlier, organizers need to re-evaluate whether consensus conferences are the right tool for involving the public in science and technology policy-making.

3. Reflexivity on the part of social scientists

The solution to the problem of fit of the form of the participatory exercise to its goals and rationale as well as to the policy process and the political culture lies to some extent in greater reflexivity on the part of social scientists.

> Are consultative and participatory decision processes devised by social scientists a true path to increased democracy or just another layer of technocracy? Is it possible that rather than digging ourselves out of the technocratic hole we are really just digging ourselves in deeper? Are we seeking to compensate for the triumph of technique by devising new techniques, this time social science techniques of consultation? As social scientists, we need to ask whether such initiatives move us closer to, or further still from, the participation of an informed citizenry in key decision making. (Rayner, 2003, pg.169)

In tandem with calling for greater reflexivity from scientists; social scientists and STS scholars have to also display the same reflexivity. Most of the participative exercises on science and technology topics are being organized and conducted by the latter. A more critical approach is required regarding the motives, purpose and organization of public participation in science and technology. Public participation has the potential to create a more socially robust scientific enterprise and self-reflection and critical thought can help to realize this potential.

Appendix A
CODEBOOK

Category	Description
Code at the level of utterance. The entire deliberation consists of a number of utterances delivered by the participants and facilitators. Each may consist of a number of sentences expressing a single or multiple thoughts. Often the sentences are run on sentences that may be as long as a paragraph. A speech or utterance will include a number of statements that fall in different categories. If the categories are different, code the utterance in both categories. Coherence can an issue so read the complete utterance first and then identify the statements contained within. After identifying the type of utterance, then code each for the kind of utterance.	
Number of utterances	Count each time a participant speaks
Type of utterance	
Initial statement	Statements that are uttered to make a new point or to introduce a new topic. Code as 1.
Response to facilitator	Statements that are uttered in response to a query by the facilitator or to a prior statement or interjection made by the facilitator. Code as 2.
Response to participant	Statements that are made in response to a prior statement made by another participant or to answer a question asked by a participant. It may or may not be a response to an immediately prior statement. A statement is a response when it specifically comments on a previous utterance or mentions a participant by name. An utterance made by a participant that does not introduce a new topic but pertains to a topic already introduced by another participant will also fall within this category. Code as 3.
Interruption	Statements that interrupt another participants sentences, train of thought, or argument.Code as 4
Y/N queries	Questions that are closed whose response can be only yes or no. Code as 5
Y/N responses	Responses to Y/N queries. Code as 6.
Kind of statement	After coding for type of utterances, code for the kind of utterance.
Announced credentials	Statements made by the participants introducing/ describing themselves. These are different from statements of expertise. These were made by the participants while introducing themselves at the start of the first day of face to face deliberation.

Convergence-seeking responses	Statements that express agreement with another statement or indicate recognition and/or comprehension of another statement, but not necessarily agreement, to another's point. These are different from the Y/N responses as the speaker explicates the reason for convergence or agreement. A convergence seeking response can be coded as such only when one can identify a specific word that conveys agreement such as "I agree".
Disagreement-relevant responses	Statements that are objections or challenges. They contradict or explicitly disagree with a statement made prior. These may deny the truth or accuracy of any statement or offer problems or questions that must be solved if agreement is to be secured. These are different from the Y/N responses as the speaker explicates the reason for disagreement. A disagreement relevant response can be identified by the use of words such as "I disagree", "but"'
Statements of assertions	Statements of opinions or preferences. For example, "I think..", These may include assumptions and preferences and cannot be validated.
Factual statement	Statements regarding a state that exists or has in the past. These statements can be verified. These are stand alone statements and are neither opinions nor reasons.
Emotive statements	Statements that are expressions of personal feelings. These are unverifiable. Identifying phrases may be "I feel"; or the use of an emotion as a verb.
Reasoned statements	Statements that support or expound other prior statements by offering support/ justification such as evidence or source, facts, or by citing a rule of logic or analogy. The reasons could be practical such as citing evidence, or be based on norms or appeal to shared values (fairness, democracy, justice) or may use analogy (infer from a familiar area to the unfamiliar, use of "as if", "like") . These are explanations for statements of assertions, emotive statements or reasons for disagreeing/agreeing with other statements.

Narrative statements		Statements that support or expound other prior statements by using personal experience or stories and anecdotes to justify. These are explanations for statements of assertions, factual or emotive statements or reasons for disagreeing/agreeing with other statements.
Statements of expertise		Statements of expertise are statements that support or expound other prior statements by making claim to specialized knowledge. They may refer to training, education, or profession as a reason for their argument.
Informational query		Statement eliciting additional information. The query may be regarding the topic of deliberation or may be about the process and format.
Reciprocity		Inviting others to speculate or elaborate; encouraging, inviting or affirming the other person; questioning others; seeking others' opinions. These are different from rhetorical statements as they are addressed to particular participants. Phrases such as "I liked what A said about", "Don't you think", "Why do you…"
Other Codes		
Sources		The types of sources people might use to support their claim. The three categories of sources are experts, background materials, or other participants.
Meta-Talk		Talk about the deliberation or the process itself
Social talk		Statements that are not about the topic of deliberation or about the deliberation process
Facilitator Statements		
	Introductory statements	Statements made by facilitator to introduce herself/himself
	Process statements	Statements made by facilitator to describe the process and format
	Elicitation (specific)	Eliciting opinions/views of particular participants. The facilitator may address a participant by name or may ask for an opinion from those who support a particular viewpoint.
	Elicitation (general)	Eliciting opinions/ views of all the participants. No specific participant is being addressed. Phrases such as "Is that okay", "Does everyone agree", "What do you all think".
	Clarifying questions	Addressed to particular participants asking for

		clarifications regarding a previous statement made by the participant.
	Interventions	Statements made by facilitator when intervening if two participants are in conflict
	Summary statements	If facilitator offers a summary of the discussion, not necessary a summary of entire discussion, but what has been stated in the last few turns.
	Anchoring Statements	Statements made by facilitator to introduce a new subject or topic
	Redirecting Statements	Redirecting the off-topic conversation back to a particular topic
	Social talk	Statements that are not about the topic of deliberation or about the deliberation process
Themes		The textual topic or subject of the statement.
Time		Coding for time
	Time spent by each participant talking	The number of lines of transcribed text. Each line to count as 1. Sentences that are more than half a line count as 1. Sentences that are less than half a line count as 0.
	Time spent on each topic	The number of lines of transcribed text that pertain to a specific topic.

Appendix B
Interview Questions for Facilitators

1. How would you define the role of a facilitator?
2. Do you have any experience in facilitation?
3. Do you have any training in facilitation?
4. Did you come across any instances when your training or experience was inadequate?
5. Did you read the background materials in depth? Did you have any prior knowledge of the topic?
6. How did you deal with questions regarding the technology?
7. Could you describe the panel of participants?
8. Could you describe the dynamics in the room?
9. What was the biggest challenge for you as a facilitator?
10. Did some participants regularly interrupt others? How did you manage them?
11. Were there any participants who contributed little to the deliberations? How did you include them in the discussions?
12. What were the sources that the participants referred to for clarifications?
13. Could you please take me through the first face to face weekend?
14. What was the second face to face weekend like? Was it easy to reach a consensus regarding the final reports?
15. Were there differences in the manner in which participants interacted with each other over the two weekends?
16. What was the experience like for you?
17. Is there anything that you would have done differently in terms of facilitation?

Appendix C
Interview questions for Participants

1. What was your motivation to participate in the NCTF?
2. Did you read the background materials? What do you think of them?
3. Did you have any prior knowledge of the topic? Do you think you were well-informed about the topic?
4. Can you describe the other participants?
5. Could you walk me through the first weekend?
6. What were the internet sessions like?
7. Could you walk me through the final weekend?
8. In case of clarifications, what sources of information did you depend upon?
9. Were you provided with opportunities to speak?
10. Do you think your views and concerns were heard?
11. Do you remember any disagreements?
12. Were there any participants who dominated the discussion?
13. Do you think all participants contributed to the discussions?
14. Did you learn new information from the group than what was in the background materials?
15. Was it easy to reach a consensus regarding the final report?
16. Do you think the final report reflects your views and concerns?
17. Could you describe the facilitators? How did they manage the process?
18. What was the experience like for you?
19. Have you kept in touch with developments in this field?
20. Have you or will you participate in any other deliberative exercises?

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